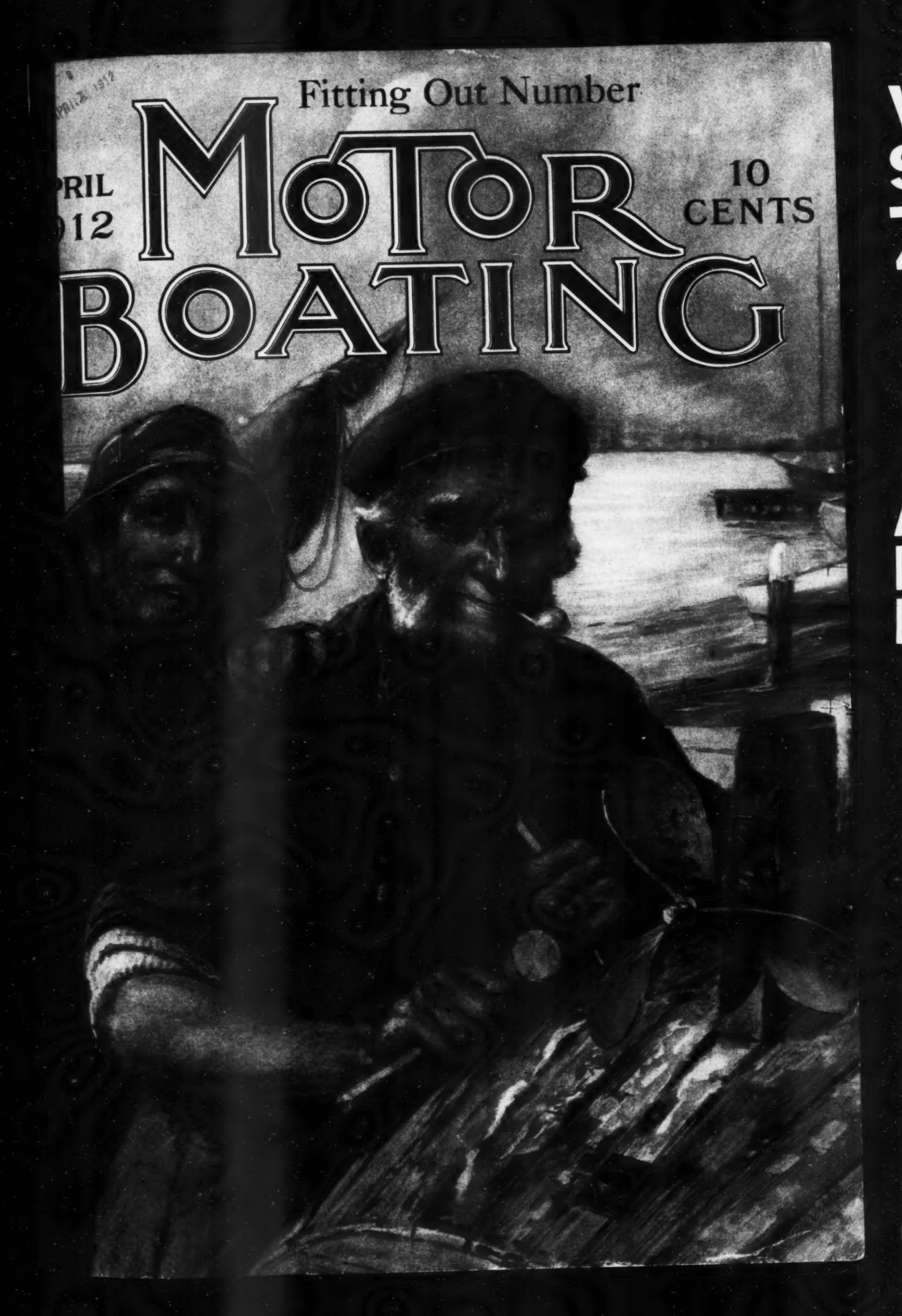
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Elco MOTOR BOATS

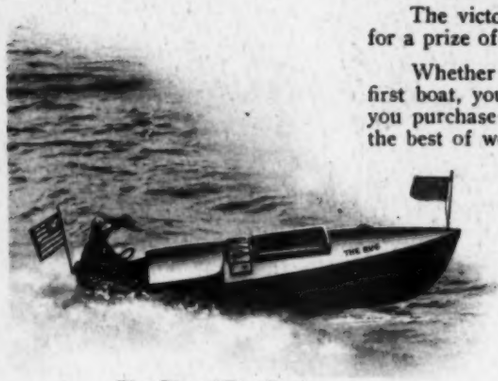
35-ft. Elco Express
Speed 24 miles per hour, guaranteed.

"You'll always be" proud of your Elco —

PROUD of its grace, of its elegance and comfort—of its *guaranteed* reliability. Few builders have had our twenty years' experience; fewer still earned a reputation so sound, and none built boats which year after year win such victories as do ELCO Express Launches and Elco-Planes.

The victory of the 16-ft. Elco-Plane, "The Bug," over Mr. Gould's 185-ft. S. Y. "Helenita" for a prize of $5,000, was one of the notable sporting events of 1911.

Whether you desire a motor boat for racing or for pleasure, especially if purchasing your first boat, your only safety is to depend upon the integrity of the builder. Nowhere else can you purchase as much *dependability* as in an ELCO and at prices no higher than need be for the best of workmanship and material.



Elco-Plane "The Bug"
Speed 35 miles per hour, guaranteed.

Elco speeds Guaranteed or no sale.
Elco boats and engines Guaranteed for one year.

Elco Express Launches	Elco-Planes of the "Bug" Type *Patent applied for.*
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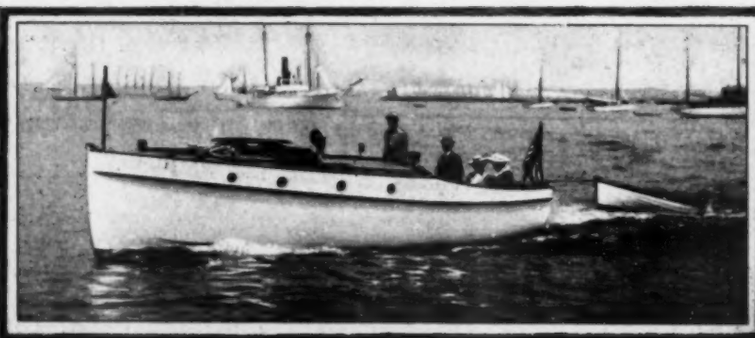

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The simple smooth-running STANDARD gives that real satisfaction of knowing that you are saving money in running expenses. STANDARD economy is the result of development of details in an engine long ago proven correct in principles of design—an engine that before this high stage of development was reached won its world-wide reputation.

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STANDARD MOTOR CONSTRUCTION CO.
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New York, January 2nd, 1911.

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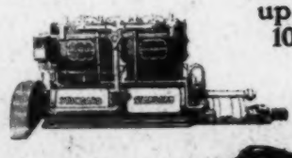
Yours truly,
H. [illegible]



"Power up to 1000"

Contents

APRIL - 1912

The remarkable picture on this page is the reproduction of an actual photograph of a motor boat in a tide rip in Casco Bay, Maine, taken by Miss Esther Root.

The National Magazine of Motor Boating

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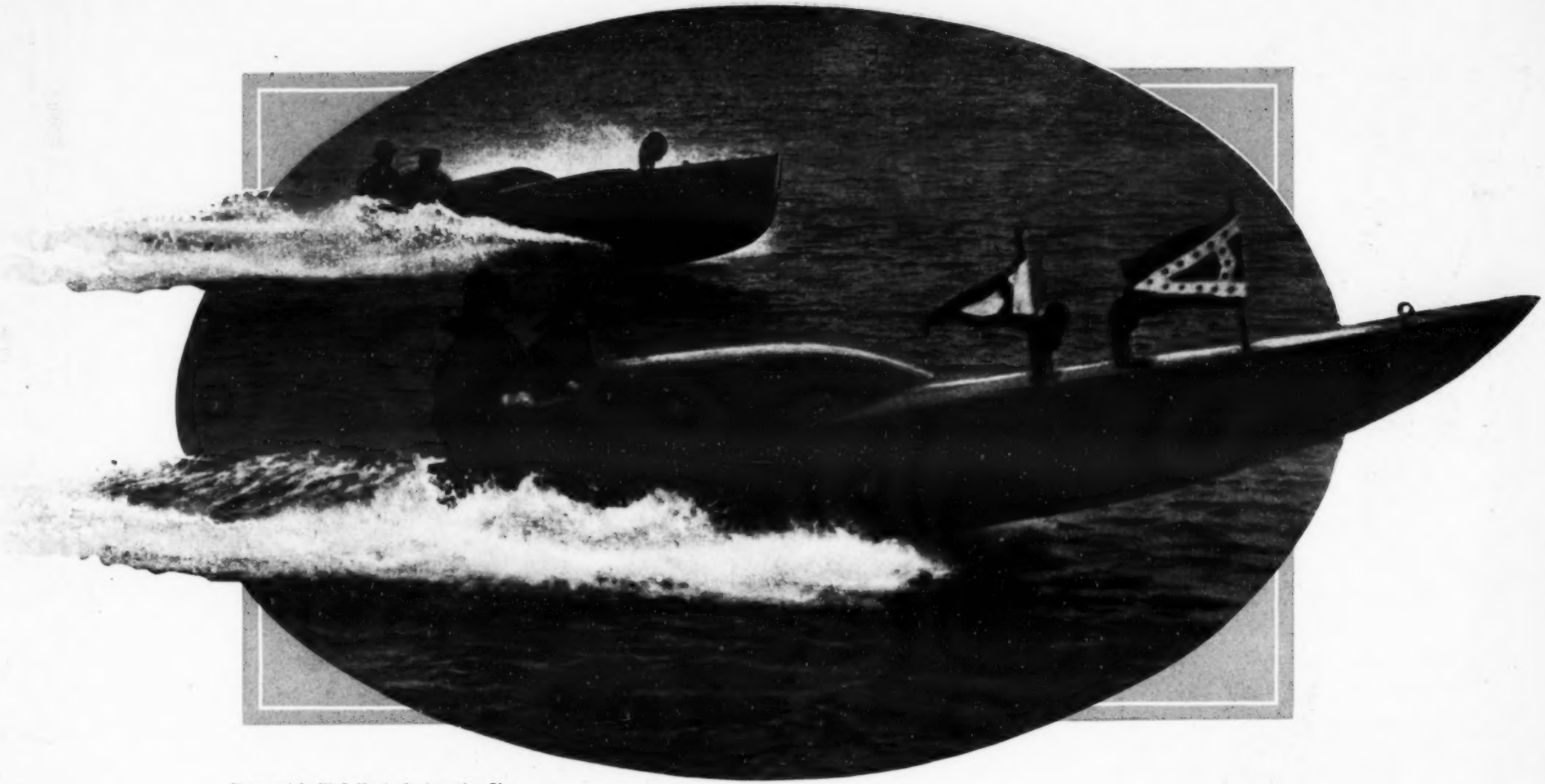


Photograph by W. J. Harris, St. Augustine, Fla.

A brush at St. Augustine—trying out Commodore Blackton's new Reliance hydroplane, Vita, Jr., with his famous Elco express tender, Vita.

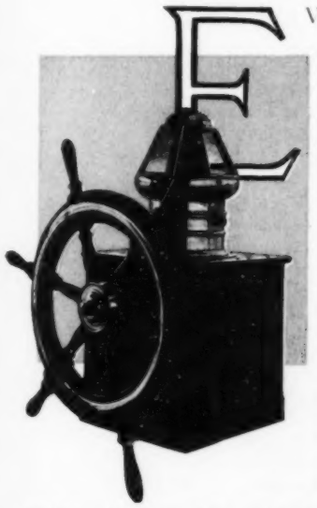
MOTOR BOATING
THE NATIONAL MAGAZINE OF MOTOR BOATING

Running the Coast.

The Use of Chart, Log, Lead and Compass in Coastwise Cruising. The First of a Number of Articles on the Various Phases of Navigation.

By William C. Ward.

For some time we have been planning to run a series of articles on the various phases of the subject of Navigation, but not until now have we felt that we had found the right man to furnish them. Mr. Ward, the writer of these articles, not only has had an academic training, but has had much practical experience in the handling of vessels in all parts of the world, and recently has been engaged in exploring and pioneer chart-making for the Government in the unsurveyed portions of Bering Sea. The next article of the series will appear in the May Issue and will deal with Dead Reckoning.—EDITOR.



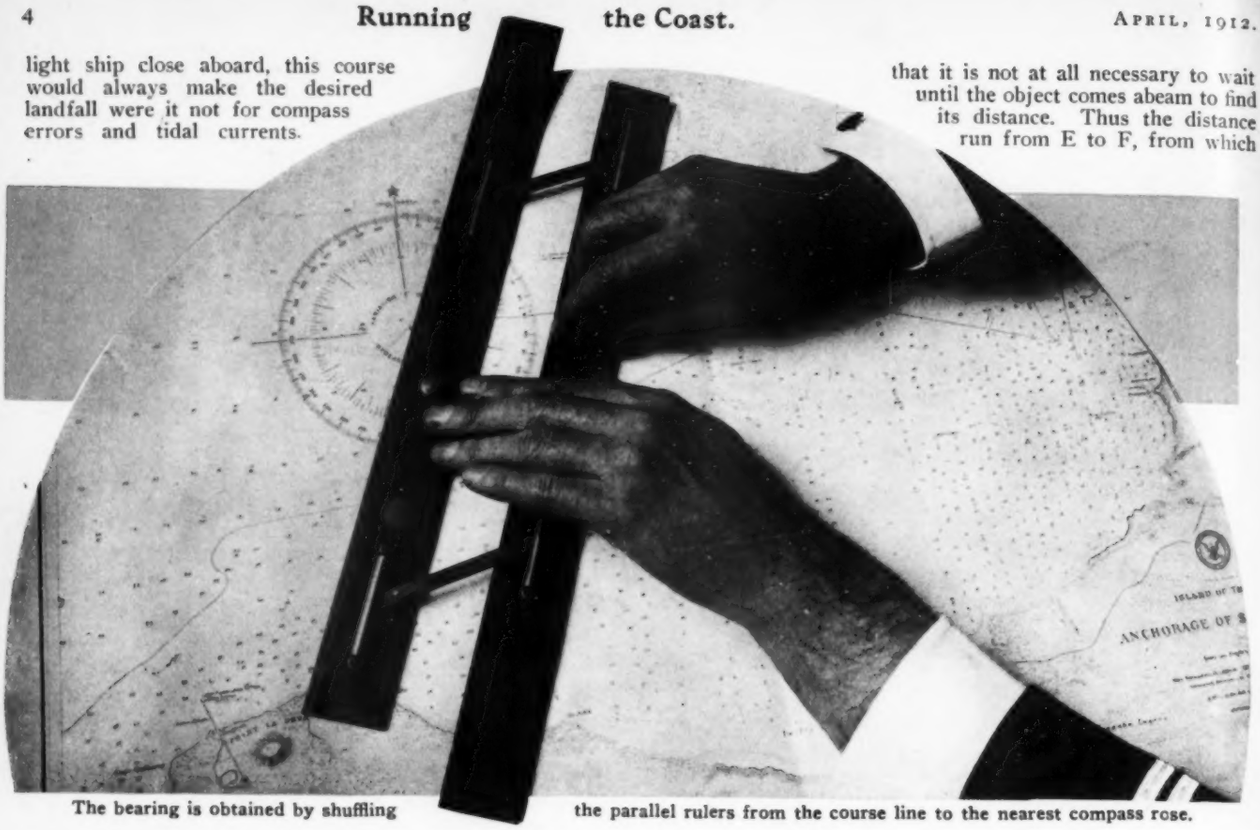
EVERYONE who has undertaken to cruise beyond the limits of his local piloting knowledge has formed a good idea of the value of a chart, but it is doubtful if even the average man who passes the board examination for mate's papers has acquired complete command of all the little useful marks and gill-guys found on every chart. For mates become captains, and the local boards of inspectors are forever investigating wrecks and groundings that would never have happened had the skipper been ready with the right combination of chart, lead, log and compass. A serious study of these matters has not yet been generally undertaken in the world of motor boating, perhaps because the subject takes no account of hissing coamers and racing wheels, except in so far as they knock down the speed and interfere with the reckoning. Yet navigation is no arm-chair seamanship; rather is it the intelligent exercise of that caution which is characteristic of the good sailor.

In its broadest aspect the chart gives what amounts to a bird's eye view of the cruising ground, adapting it to the particular needs of the navigator by eliminating all perspective. And as soon as this conception is attained it will be quickly realized that the ordinary chart meets and even exceeds all the requirements of a relief map. Not only are the promontories and recessions of the coast line clearly defined, but the hills and valleys ashore are well delineated by hachures and shading. And while it is perfectly true that the various characteristics of the country are indicated by conventional symbols, there is no chance to confuse the rows of dots that indicate a sandy beach with the short, sharp scratches that mark a rocky one; nor is there any need for soundings to confirm the meaning of the bold coast line used to indicate a steep-to approach to the land. The experienced navigator unconsciously imagines his eye in the plane of the paper and draws from the chart a fairly good picture of what is ahead. When approaching a sharp bend in a river it is easy for him to fortell just how the various points and coves will appear when they open out; and he thinks of his distance from either shore, not in miles, but in thirds or quarters the width of the stream. For more accurate information, where necessary, he looks to the buoys, which he knows are plotted and colored on the chart just as they stretch out before him in reality—red to starboard and black to port when entering a harbor or working upstream. To carry these picture making properties of the chart a step further and submit them to the extreme test, it is an easy matter to draw a line across some bend in a river and drop perpendiculars upon it from the prominent points along the shore ahead; then, laying off on a suitable scale from the first line along each perpendicular the height of its corresponding point as given on the chart, and connecting these points with a continuous line, there will result an accurately scaled outline of what will be seen ahead when the bend opens out.

Eye-piloting of this kind enables one to navigate many miles of strange waters relying solely upon the chart and without reference to compass courses, so long as the waters are narrow enough to admit of estimating distances with reasonable accuracy; but open water such as bays and sounds is quite another proposition. It is commonly required to lay a compass course from, say, a given buoy to a light house ten or fifteen miles away. The light house is not visible from the point of departure, and the longshore buoys are often too far apart to be seen one from another. Here the dividers and parallel rule must be added to the equipment, the one to transfer distances from the scale of nautical miles to where they are needed, and the other to get a course or bearing from the compass rose and move it at will parallel to itself to any part of the chart.

A case in point is that of a vessel leaving Buzzards Bay for Newport on a hazy day when it would be necessary to lay a definite course to pass Sakonet Light, say, 1¼ miles distant. Before reaching Hen and Chickens Light Ship, lay the parallel rulers on the chart from there to a point the required distance off the light and shuffle them along, moving one section at a time while holding the other firmly in place, to the nearest compass rose so that the beveled edge of one section passes through the center of the circle. Then read the course, West ⅜ North, from the graduations along the circumference. Passing the

light ship close aboard, this course would always make the desired landfall were it not for compass errors and tidal currents.



The bearing is obtained by shuffling the parallel rulers from the course line to the nearest compass rose.

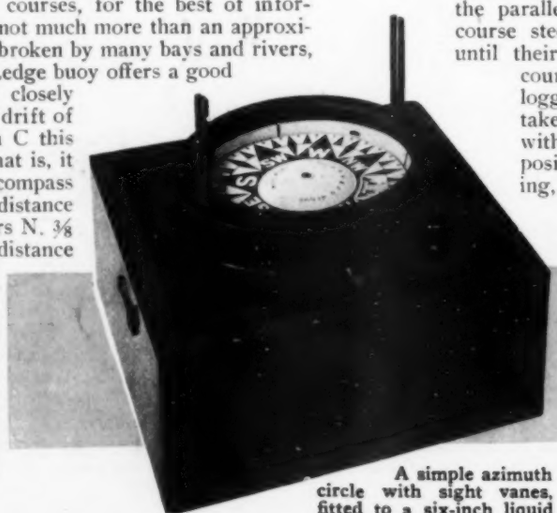
Compass error, being one of the chief factors that make navigation a science, is too large a subject to be gone into at present, but the set and drift of the tidal current can readily be found from the chart, or better still from the tide tables published by the U. S. Coast and Geodetic Survey. Here, the arrows on the chart indicate a northeasterly set of one knot, or nautical mile of 6,080 feet an hour on the flood tide, and a corresponding southwesterly set with the same drift on the ebb. This is an extremely simple case, for the flood and ebb tides do not commonly set in exactly opposite directions. Now if the vessel runs W. ⅜ N. one hour, logging eight knots, and the tide is flooding, she will fetch up at the same point as if she had run W. ⅜ N. one hour and then hauled northeast for one mile. That is, should a fog shut down, the end of the hour will find her about to pile up on Sakonet Ledge, if, indeed, she has happened to miss Elisha Ledge on the way. So that in the first place the course should have been shaped West, southerly, for a point B, one mile southwest of A and two miles from the light house, in order to allow for the cutting down by the tide. In like manner the vessel would fetch up a mile too far to the southwestward if the tide were ebbing, but she has the whole North Atlantic for leeway in that direction, and no matter how thick the weather might become she could always haul northerly and get a new departure the moment land was picked up again.

It is always desirable to check up the position at intervals when running long coastwise courses, for the best of information about tidal currents is not much more than an approximation where the coast line is broken by many bays and rivers, and in the present case Elisha Ledge buoy offers a good opportunity to ascertain how closely we have estimated the set and drift of the current. For the position C this buoy is broad on the bow; that is, it bears N. W. ⅜ N., or four compass points from the course. The distance run from C until the buoy bears N. ⅜ E., or abeam, will equal the distance from buoy to ship when she brings it abeam at D. Laying this distance off with the dividers along a N. ⅜ E. and S. ⅜ W. line from the buoy will give the location of D.

This method of finding distances by doubling the angle on the bow holds good for all values of the angles, so that it is not at all necessary to wait until the object comes abeam to find its distance. Thus the distance run from E to F, from which Schuyler Ledge buoy bears N. W. by W. ⅝ W. and N. W. ⅜ N., or two and four points on the bow, respectively, will equal the distance from buoy to ship at the time the second bearing was taken, and a perpendicular dropped from buoy to the course line will give the distance at which it will be passed abeam.

But the most common and convenient method of fixing the position at once is by the use of cross bearings. If Cormorant Ledge Buoy bears N. ¼ W. and Sakonet Light House N. by E. ¾ E. at the same moment, the observer is somewhere on a line running S. ¼ E. from the one and somewhere on a line running S. by W. ¾ W. from the other; hence at the point G where the two lines intersect. If a third bearing line such as Elisha Ledge Buoy, E. ¼ N., should meet the other two reasonably close to G all possibility of error is eliminated, and the position can be trusted implicitly. Extremely sharp or obtuse angles are to be avoided whenever possible, for the lines will have no well defined intersection and on a small scale chart the resulting ambiguity may amount to a mile or more.

It often happens when lying to in a fog that only one known object ashore can be seen occasionally through rifts. But the position of the vessel can, nevertheless, be determined closely enough to lay a new course to destination by taking one bearing and running a safe longshore course until the same object is seen again and a second bee-line can be had. These two bearings, reversed and plotted from the object ashore, will show two diverging lines making seaward, and if the parallel rulers are laid across them on the course steered between bearings and moved up until their distance apart, measured along this course, is equal to the distance actually logged between the times the bearings were taken, the intersections of the bearing lines with the edge of the parallel rule will be the positions of the ship at the time of each bearing, and a new course may then be shaped from the last of these positions without standing in shore for information.



A simple azimuth circle with sight vanes, fitted to a six-inch liquid yacht compass.

While the taking of bearings consists simply of bringing the center of the compass and the eye in line with a distant object and that point on the periphery of the compass card from which the bearing will be read, it requires more practice and nice judgment to get a reliable compass azimuth every time than to

The Negus patent yacht log, with line and rotator, which is towed astern. The device is made fast to the taffrail and the dial registers the distance in nautical miles.

take a correct altitude of the sun with a sextant. The oscillations of the card due to the rolling of the vessel can be allowed for by noting the mid-point of the swing, but the parallax caused by the tilting of the bowl in its gimbals and the indiscriminate yawing of the vessel due to poor steering and the heave of the sea are quite beyond correction and often amount to as much as a whole point of the compass. Then there are certain weather conditions under which nothing that is not nailed down will keep still, whether mounted on gimbals or not; and since the vessel must change her heading before the compass card can begin its corresponding swing, the compass cannot be expected to keep up with the gyrations of the ship during a series of heavy rolls and lunges. When real cruising is undertaken the time has come to invest in a standard compass; nobody can take bearings over one that is jambed in somewhere between the steering wheel and cock-pit coaming. And with a standard binnacle so placed that it commands a sweep of most of the horizon should go an azimuth circle or some other of the various sight-vane attachments that admit of taking bearings to the nearest degree. We have all seen people squinting over their finger tips and bringing the hand down across the compass to read a bearing, and while with practice one can take bearings to the nearest quarter-point in this way, a quarter-point error means one mile in twenty, and the system will not do aboard fast motor craft. In selecting the best position for the standard compass the only two vital points to be considered are: it must command as great an arc of the horizon as the construction of the vessel will permit; and it must be placed so that the center of the card lies directly above the midship center line of the vessel, or there will result a constant error due to unsymmetrical arrangement of the surrounding iron which defies all attempts at correction by compensating magnets and balls. Of course no one would set up a standard compass a foot or two from a boat davit, but even this point is subordinate to the last-named. The standard binnacle need not be of the compensating type. They compensated compasses just as well before there were compensating binnacles; but to have arms for the iron balls and trays for the steel correcting magnets already a part of the binnacle is, nevertheless, a great convenience.

While the practice of standardizing the wheel so that distances run between bearings may be gotten at through revolution or time tables already prepared is, no doubt, sufficient for all the practical purposes of smooth water cruising, it doesn't take much of a sea to knock down the speed considerably on its own account long before there would be any necessity for throttling down the engine. For all around work there is nothing like a patent log, and there are a number of them on the market designed especially for small craft, but having all the characteristics of the instruments carried by the ocean greyhounds. In the olden days when a school of seamanship that has long been forgotten sent its disciples abroad over the waters of the earth, they hove a bottle overboard abreast the fore rigging, timed its arrival at the mizzen chains, multipled the result by the ratio of 6,080 feet to this distance and called the final product the speed per hour. Later, the chip log, working on the same principle, but attached to a marked line, was dropped over the stern and the line paid out while the sand in a 28-second hour glass flowed from one bulb to the other. The speed per hour was then called equal to the number of knots or kinks in the chip line that had passed over the taffrail; hence the word knot. All this did well enough aboard a wind-jamber, jambed up into the breeze with the main royal ashiver or full most of the time, according to the helmsman's skill in keeping by the wind, and where the course was uniformly recorded as six points from what the mate of the watch guessed as the direction of the wind, after deducting another guess for leeway. But the only way to tell at any moment just how far the vessel has run from the last point of departure is to keep a patent log over the stern all the time. The watch-like dial attached to the taffrail keeps on recording the knots and tenths just as they are communicated to it from the rotator towed far enough astern to keep it out of the deadwater in the ship's wake, and the difference between any two readings of the dial will instantly give the distance traveled in the interim.

Last, but by no means the least important of the coast pilot's sources of information, is the lead with its marked line. A seven-pound hand lead will meet all ordinary requirements, and the hollow in its base should always be filled with soap or tallow so that it will bring up a specimen of the bottom to guide the navigator to good mud holding ground when looking for an anchorage. Frequent soundings are also invaluable as an indication of approach to the beach in thick weather, and may, indeed, be used to find the ship's position by plotting a series of them taken at a fixed distance apart upon a piece of tissue paper which is then laid on the chart so that the line of soundings lies in the direction of the course steered. Now if the paper is moved about until a row of

With the azimuth attachment it is possible to determine the bearing of a distant object within one degree.

soundings is found upon the chart that agrees with those actually taken and plotted, it is safe to assume that the vessel is running along the line connecting the soundings as found on the chart. The character of the bottom as brought up by the arming on the lead and compared to the symbols on the chart will serve as a further check to confirm the agreement between the two lines of depths.

The conventional way of marking the lead line, and perhaps as good a system as any, is as follows: at two fathoms, two strips of leather or cod line turned into the lay; at three fathoms, three strips; at five fathoms, a white rag; at seven, a red rag; at ten, a piece of leather with a hole in its center; at 13, a blue rag; at 15, the same as five; at 17, the same as seven; at 20, two leather strips, etc. The depths for which there are marks are called "marks"; the intermediate depths are recorded as "deeps," so that when taking soundings the leadsman, after swinging the lead over his head several times and shooting it as far ahead as he can, sings out as he feels bottom with the line up-and-down, "Deep, six; mark, five; mark under water, five; a quarter less five; and a half, four; deep, four," etc.

A good leadsman who knows how to heave his lead well forward of the stem can take approximate soundings while running at a speed of from eight to ten knots, but it is always best to check the vessel down a little, for it is generally the case that where soundings are wanted at all they are needed badly enough to render their careful taking worth while.

With compass, chart, lead and log one is prepared for any emergency that may arise in every-day coastwise navigation; it only remains for continuous practice to impart a thorough knowledge of their uses and peculiarities. So many and devious are the vagaries of the compass that they must be left for discussion under Course Corrections in the forthcoming article on Dead Reckoning. The chart, however, is a hard-and-fast proposition, and it is worth while learning what manner of thing it is before expecting too much of it.

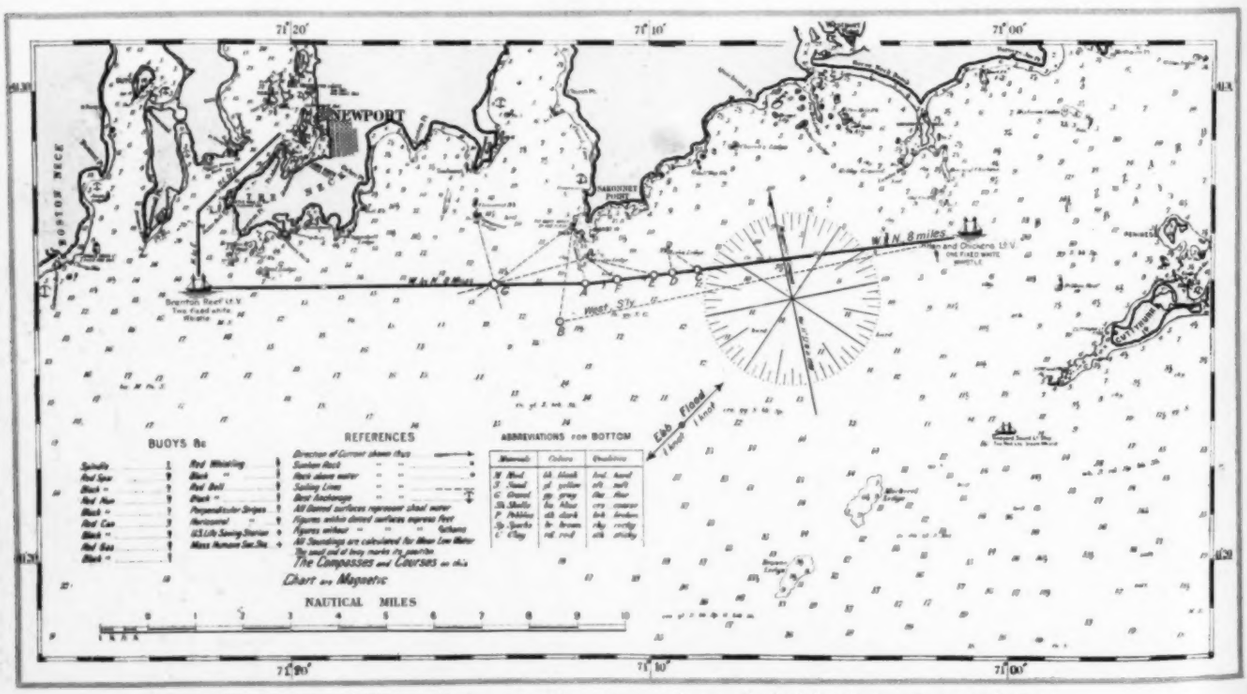
When one attempts to represent any considerable portion of the earth's surface on paper a fundamental and formidable obstacle is encountered at once: it is impossible to mash a spherical surface into coincidence with a plane without tearing it apart; so that no representation of such a surface on paper can show things in either their true magnitude or relative positions. Recourse could, of course, be had to perspective; but of what use would any scale of distances be on portions of the chart where miles appear of different lengths, converging into the distance as do the rails of a car track? However well such maps serve the purposes of an atlas, they are on this account utterly useless for the purposes of navigation; but the problem has been solved by first projecting the various points of the earth's surface onto the surface of an intermediate circumscribed figure that can be rolled out or developed into a plane, and then, after cutting along one side of the central meridian, rolling the circumscribed figure out flat. We then have a chart that is at once angle-true and at least as distance-true as is the earth itself.

Of the several projections used may be mentioned the orthographic and stereographic, which are the conventional perspectives ordinarily found in geographies. They differ only in appearance, due to the viewpoint chosen, which in the first case is a point on the surface of the earth, and in the second a point at an infinite distance away. Both are utterly unsuited to navigation. In the gnomonic or central projection the eye is supposed to be at the center of the earth; hence all great circles, those whose planes pass through the equator, are seen as straight lines because they are viewed end-on, so to speak. In general appearance a gnomonic chart distorts so outrageously that one could not distinguish Italy from Burmah, but such a chart is of great value for laying off long trans-oceanic courses where the great circle is followed as closely as the weather will permit, because it is always the shortest distance between departure and destination. The elements of such a course can be read by inspection from the straight line drawn on a gnomonic chart, while great circle sailing by the computation which would be necessary wthout a chart of this kind is no joke, and modern navigators have no time to waste on it.

The polyconic and Mercator projections by development are, on the other hand, particularly adapted to the needs of the navigator; the first because it is consistently distance-true within its geographical limits, and the other because a rhumb line or ship's track is always a straight line so long as the course remains unchanged. In the polyconic projection, which is the most scientific method in use, each parallel of latitude is conceived as the base of a cone tangent to the earth's surface at all points in that particular latitude. When all of these cones are cut along their slant heights, rolled out flat and properly placed on the paper that is to become a chart, each parallel will be represented in its true length, and the curvature acquired by each in the rolling-out process will attend very nicely to the convergence of the meridians as they approach the poles. Charts of this kind are published by the Coast and Geodetic survey, and as a compromise between correct distances and correct courses they are practically ideal, being capable of representing an area as large as that of continental United States without appreciable distortion. But care must always be taken to re-lay long courses at intervals, or the curvature of the meridians and parallels will cause the destination end of the line to fetch up many miles away from where it ought to be.

Mercator surrounded the earth with a cylinder that touched it along the equator; projected the parallels and meridians onto it by producing the radii; rolled out his cylinder into a rectangle, and the chart was finished and ready to trace in the land by points according to latitude and longitude. For gen-

(*Continued on page* 84)



There is a lot of information on the chart frequently overlooked by the amateur navigator.

The CRUISE of the WANDERER

Adventures and Explorations of Three Gringoes While Opening New Regions for Motor Boating in the Unknown Waters of the Gulf of California.

By Michael Williams.

Author of "Real Men Stories of Arizona," "A Fight in One Round," etc., etc.
Photographs by E. A. Salisbury and the Author

PART II.

Life among the Seris—Off for the Island of the Angel Guardian and Its Mysteries—Homeward Bound

AS we dropped our tender from the davits, the Seris were crowding into their clumsy dugout canoes amid a shrill and continuous clamor of women, children and dogs. There seemed to be at least a dozen dogs to every Indian. And they were the yellowest, skinniest, most abject-looking set of curs that ever were gathered together.

"Hurry up, now, everybody!" exclaimed Captain Salisbury, "Let's get ashore before they begin crowding on board."

We already had filled several large canvas bags with hundreds of packages of cheap cigarettes and matches and other small articles to be given away. Besides these things we had a number of parcels of clothing which Salisbury had collected in Guaymas.

"When I first visited the Seris," said Salisbury, as we pushed off from the Wanderer and rowed toward the beach, "hardly one of them had more than enough clothing than would dust a flute. It's been my habit to supply them with the cast-off clothing contributed by my Mexican friends for a number of years past, together with cooking utensils and other odds and ends of the things of civilization. I think I've got 'em all fairly decent and respectable by this time. All the same, don't let's get separated on shore, and don't let any of them begin to fool with your revolvers on the pretext of examining them."

"As a hobby, the civilizing of a cannibal tribe is certainly interesting," remarked the Señora. "But I wish you'd left them alone. After traveling a thousand miles to visit a cannibal tribe I feel cheated of a thrill or two. Oh!" she cried, as one of the approaching canoes drew near. "The funny stories I've read about cannibals wearing plug hats must be true, for there's an Indian actually wearing one!" Her excited laughter, however, died away a moment later, as she whispered, "But I guess they're not so very civilized, are they? What wild-looking faces!"

We were now surrounded by the canoes, in which the Seri men and women were waving their hands and shouting to Salisbury, but directing their chief attention in wide-eyed staring at his white woman companion.

The first hasty impression produced by their savage faces was that they were strangely different from all other types of American aborigines that I have seen. There is something decidedly Chinese, or Tartar-like, in the aspect of most of them. Their language is also decidedly unlike any other that I have heard. It is a strange, creaky guttural, and is said to be very much like that of the Twelchii tribe of Patagonia, whom they are said also to resemble in physique.

As soon as the Seris saw that Salisbury was in the rowboat, and that the rowboat also contained the bulging canvas bags no doubt pleasantly associated with their memories of his previous visits, they turned their canoes and escorted us to the beach. As our rowboat grounded, half a dozen of the younger men dashed through the water and hauled it to a place from which we could step ashore dryshod. We had landed at a spot where there was a large canoe drawn well up on the beach, in the bow of which sat a dignified, calm, middle-aged man who was directing our boat-haulers in their efforts. This was Juan Tomas, the present chief of the tribe. He and Salisbury were soon shaking hands and heartily exchanging the few words of Spanish which Juan Tomas commands. He is the only one in the tribe who can speak any Spanish. Salisbury's first act was to introduce the Señora to the chief. One would like to add, in order to give a touch of vivid color to the narrative, that the chief of the cannibals gazed at the apparition of the white woman with open-eyed astonishment, but the truth is that he didn't show any more surprise or any more emotion than a cigar-store Indian on Broadway. But the women and children of the tribe were as openly and naively curious as a crowd of New Yorkers would be if a Seri appeared among them—and that, as the phrase runs, is going some; for I affirm that in all my running about on the face of the earth I have yet to find people more curious than your metropolitan New Yorker.

Even the excited interest occasioned by the bringing of the gift bags from the boat could not divert the attention of the Seri women and children from the Señora. They crowded about her,

The only evidences of art I could find among the Seris where a few crude figures and designs scratched on the jaw bone of the whale.

A half dozen husky paddlers could push one of the flat bottom canoes almost to the planing point.

timidly fingering her khaki skirt, or her trim shirtwaist, and absorbing every detail of her appearance, meanwhile chattering at a great rate one to the other. There was one handsome boy, the nephew of Juan Tomas—a boy of strikingly refined face and bearing—who seemed positively fascinated by the Señora. When she sat down on the beach, near where Salisbury was now beginning to open the gift bags, he sat close by her, gazing at her steadfastly, and every now and then shyly yet earnestly pressing a gift of pearls upon her acceptance. These pearls, to be sure, were of very little value, being merely the seed pearls which abound in the oysters of these waters, but they were his treasures, nevertheless, and meant much to him.

"You've made a sweetheart, Señora," commented Salisbury.

"Yes, and wouldn't I just like to take him with me away from here and give him his chance in the outer world," said the Señora.

"You'd only kill him by doing so," replied Salisbury. "These Seris don't live long when taken away from home."

"Home!" exclaimed the Señora, as she walked apart from the group on the beach and gazed about her at the sun-drenched, utterly barren wilderness into which we had wandered. "To think of such a place being home for any human being!"

In the midst of a tangle of sand dunes in the forefront of a wide plain lightly overgrown in spots with typical desert vegetation, were the score or so of wickie-ups which constituted the chief city of the Seri nation—which not so many years ago numbered several thousand, but which is now the mere handful we had found. These habitations are of the flimsiest and rudest kind; mere huddles, for the most part, of turtle shells, *ocatillo* wands, and bits of cactus and brush. There was only one house in the entire town which was at all substantial. This had been built by the tribe in common to use as a species of townhall, or communal assemblage chamber. Into this hut we were led by Juan Tomas, as soon as the first distribution of cigarettes and matches had been made. Soon every person in the tribe was busily and unremittingly smoking the cheap cornhusk cigarettes. The women displayed even more appreciation of the luxury than the men, and shared it with even the tiniest of the babies. But this sharing of their pleasures and good things is a noticeable feature of Seri life. Although they unquestionably deserve a great deal of the reputation for bloodthirstiness and hostility towards strangers with which they are credited, just the same, among themselves they are the kindest and most affable and truly social set of people I have ever known. Not once was a child treated otherwise than with consideration. Slapping and pushing them out of the way seemed to be unknown. Towards the end of that day when the cigarettes were running low, and most of the matches had been burned for the sheer, childish pleasure of watching the mysterious flames (for the Seris do not even possess the art of kindling a fire with flint and steel, and keep their fires going from year to year), they freely and generously shared what was left with each other.

Indeed, as I remember what one of the first of the few explorers of the Gulf, Lieutenant Hardy, said of them, namely, that "they by no means look as ferocious as they are represented, and there is something peculiarly mild in the expression of the females," my respect for the adventurous Englishman's powers of observation was increased. The Seri women, indeed, are fully the equals if not the superiors of the men in all respects, and have always exercised great influence and much authority in the tribal life. The expression of mildness in some of their faces amounted to what was almost a spiritual kind of melancholy—as if their more impressionable natures had received in the midst of their desert isolation some intangible yet potent communication from the spirit of nature. This expression was especially noticeable in the face of a girl whom we photographed as she sat sheltered from the blazing sunshine against one of the huts, holding in her arms her tiny firstborn son, who had come into this desolate spot of the world only the night before. Pose and expression recalled to mind many an artist's embodiment of the Madonna.

But the idyllic charm of this impression was rudely shattered by the grotesquely superstitious action of an old crone of the tribe who, as she observed us photographing the young mother, stooped above the child and spat in its face in order to shield it from our possibly malignant influence.

Within the tribal hut the Señora was seated on the trodden ground which formed the only flooring, in the place of honor at the chief's right hand, while the rest of us sat bunched together nearby obeying Salisbury's orders not to separate too widely. Over several fires outside, pots and kettles containing a very evil-looking mess of turtle meat and bits of cactus fruit and odds and ends of fish were cooking, and everybody seemed to be enjoying a perpetual go-as-you-please and help yourself kind of meal—not excepting the dogs, for it was no uncommon sight to see two or three Seris and their babies and their dogs all helping themselves with fist or snout from the same receptacle. We were in-

A Seri group that looks as though it might have just stepped from a mural painting.

vited to partake of this Seri-land turtle stew. But though we accepted politely, we didn't make good in the actual eating.

Recently published reports in the outside world have estimated the number of the Seris now living at anywhere from several hundred to a thousand. But Juan Tomas caused a young man to make a mark in the sand as the name of each male member of the tribe was called out, and the marks numbered fifty-five. There are about thirty women, so that the entire Seri tribe now numbers less than one hundred. And soon there will be few of these left. They are dying rapidly. There are but few children, for the lattter-day Seris die off fast between the ages of two years and ten or twelve. Nature's immutable sentence of death has been passed upon this tribe, which seems to have possessed absolutely no adaptability to the influence of civilization.

After the census of the tribe had been taken we sat for an hour or more smoking cigarettes and talking with Juan Tomas through the medium of his very inadequate Spanish. We tried to get definite information which would settle one way or another the question of the alleged cannibalism of the Seris.

The last of the Seris—all that remain of this notorious tribe.

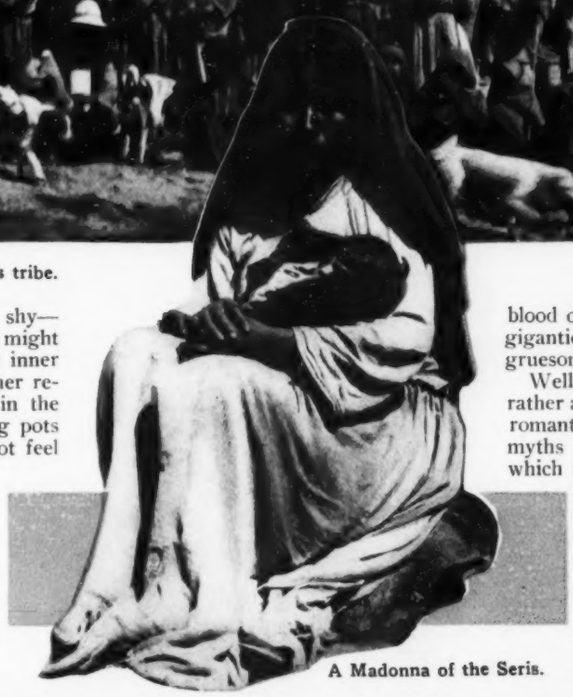
Juan Tomas proved to be as coy—not to say as shy—in regard to this delicate subject as any politician might be who was dodging questions referring to the inner mysteries of his craft. Nor did we feel altogether relieved in pressing the question home. Seated in the midst of these sinewy giants, with their cooking pots already simmering on the fires outside, we did not feel tempted to say or do anything rash that might tend to disturb our host's friendly feelings towards us. After pretending for a long time not to understand him, or deliberately misunderstand our questions, the chief suddenly threw off his reticence, and curtly said:

"Yes, I have eaten man. It was good, I liked him."

He then went on to say that the eating of man was not habitual with the Seris, nor even had it been so far as the memory of the tribe could tell. When he was young, however, there had come a "bad year." Food had been very scarce. The deer had avoided Tiburon Island. There was even a scarcity of fish. The turtles, which usually swarmed in these waters, disappeared. Even the sharks which infest the Gulf, and which the Seris occasionally use for food, were not to be had. It was during that year, said Juan Tomas, that the tribe killed a few of its own members for the benefit of the rest. "And it was the events of that terrible year which," said he, "were responsible for the tradition of cannibalism attached to his people." When asked to explain why the odium of man-eating had been put upon the Seris centuries before the year of the famine which he remembered, Juan Tomas stolidly shook his head and had nothing more to say.

Such is the statement of the chief of the Seris in regard to this question. Speaking for myself, I would be loath to decide how much faith should be put in what he says. Barbarians are no more averse to the practice of the gentle art of "jollying" the casual stranger than are more sophisticated peoples. Perhaps Juan Tomas saw that a reputation even for the gruesome made them more interesting. However, one thing at least is certain. Namely, that most of the terrible stories which had been so frequently told of late years in regard to prospectors and explorers having been served up to make a Seri holiday are sheer poppycock.

This holds true, as well, of other stories told concerning the giants of Tiburon. Only a few months ago there appeared in a prominent magazine an article which purported to be the truthful story of its author's adventures among the Seris. Landing to get water from a certain spring (which in truth happens to be on the opposite side of the island from where this article places it), he and his party were attacked by a body of Seris who opened a brisk rifle fire and engaged them in a bloody battle. In another magazine recently there was an even more thrilling account of the flights of poisoned arrows that fell about the heroic figure of the author of said article as he led his companion through a marvelous inland valley on Tiburon Island where there stood upon altars stained with the blood of human sacrifice gigantic stone idols of gruesome aspect.



A Madonna of the Seris.

Well, it does seem rather a shame to shatter romantic illusions and myths in a world from which romance (of that particular variety, anyway) is fading rapidly, yet the facts are that there are only two old, totally useless rifles in the possession of the Seris, and at the time of our visit they had only two bows and a couple of quivers full of arrows. As for the valley of the gods, having been there, and Captain Salisbury having traversed every inch of it, not once but half a score of times, I am sorry to say that these also must be relegated to the region of the non-existant.

Nevertheless, while the cannibalism and some of the more picturesque portions of the Tiburon legends must be denied, it remains true that they have held themselves inviolate by force of their own courage and ferocity from conquest and any admixture of outland blood. And now they are dying as they have lived—never having emerged in the slightest from the darkness of barbarism.

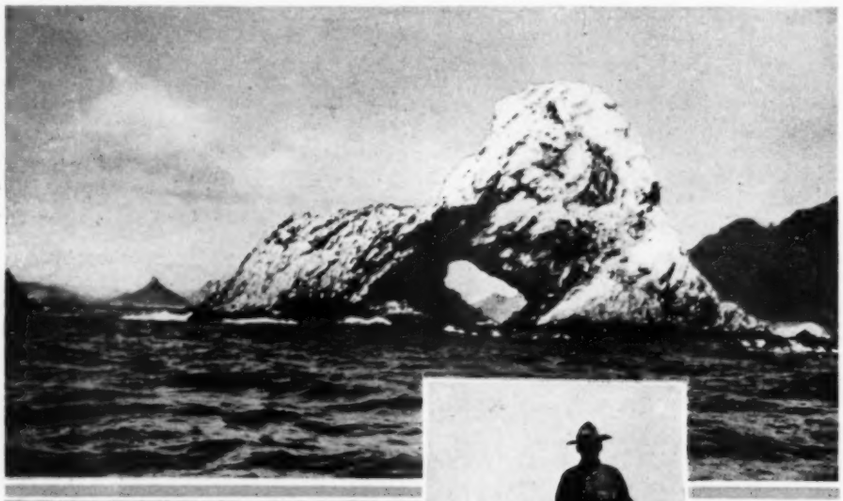
Lying in the sand outside one of the huts I discovered the only evidence of art. This was a huge piece of the jawbone of a whale on the surface of which somebody had traced a few rude figures of men and beasts. So even here, it would seem, those strange aspirations which impel the soul of man toward

the creation of beauty, had moved some savage brain and heart. But this spark would seem to have fallen too late, for it can only be a matter of a very few years now before the last of the Seris shall have vanished—swallowed up like water by the surrounding desert. When at last we brought our visit to an end and chug-chugged away in our trim motor cruiser into the dream-like waters of the great, sun-drenched Gulf, the whole experience suggested an emergence from a dream—a dream of the long dead and gone barbarian period of the earth, and the manners and customs of primitive man.

After leaving the Seri village we headed slowly northward, skirting the coastline until we reached La Libertad anchorage, just south of Cape Lobos, some thirty-five miles from the Seri village. At La Libertad there is to be found a deep well in which water is usually available. There is also a hot spring of mineral water bubbling out of the sand of the beach. It is famous among the Mexicans and Indians for its medicinal qualities, and in old days parties of Mexicans would run the risks of the desert surrounding it, and the danger from Seris or Yaquis in order to go and bathe there. Extending inland from the beach is an extensive belt of desert plain surrounded by far mountains. It is a famous resort for elk, Salisbury having often seen them in bands of several hundred. He landed me on this plain some five miles distant from the hot springs, in order to try my luck in hunting. He told me to be on the *qui vive* from the very start, as the plain literally swarmed with all manner of game. By the time I had toilsomely tramped through loose sand in a blazing heat that was like the heat of a Turkish bath at its fiercest, in the midst of an absolute silence and stillness not broken by even a jack rabbit, my respect for Salisbury's absolute veracity had gone down about as many degrees as my temperature had risen. He had also said that this plain was about as unfrequented a spot as any place in the entire desert, and yet for the last two or three miles of my vain hunting I followed a well-defined wagon trail marked with many footsteps. This finally brought me out on the beach near the well, where I found Salisbury and the Señora awaiting me. Anchored near the Wanderer was a schooner, and several half-breed Mexicans were helping Salisbury to draw water from the deep well.

I properly reproached our commander for having sent me on a wild-goose hunt instead of one for real game, but he soon explained the reason for the apparent failure. It appeared that a few days previously an American ship had put in to La Libertad, and had landed a cargo of rifles and ammunition, which had been promptly carried away in big mule wagons by a party of revolutionists who had met the filibusters at this point. Naturally enough, all the game had been frightened away. The episode threw light on the manner in which Madero's fighting force procured their excellent equipments. It was a dead-easy game for filibusters, since the Mexican government maintains only two small gunboats to guard the immense stretch of its western coast.

The schooner anchored by the Wanderer was manned by a company of turtle hunters from Guaymas, who had been near this point when the filibusters put in and had witnessed the landing of the arms. From them we obtained a young turtle caught right under our eyes, and they cooked it for us after Captain Salisbury's own recipe. It was roasted in its own shell over an open fire on the beach, and was served up to us at dinner garnished with red peppers, tomatoes and slices of lemon. I can thoroughly recommend turtle on the half-shell, a la Salisbury, to all motor boat men who follow the trail of the Wanderer, as I have no doubt many of you will.



Lion Rock is a characteristic landmark on the Sonora coast.

A shore dinner.

Here's another dish for you to try, as well—namely, deer liver and bacon. It is the creme de la creme of outdoor eating. We lived so "high," what with turtle steak, turtle eggs, turtle soup, venison in various fashion, wild game, and fish of a dozen sorts, that towards the end of the trip the Señora ruefully confessed that what she was longing for more than anything else was plain corned-beef and cabbage.

The Gulf of California is one of the greatest fishing grounds in the world.

Shortly before sunset I saw one of the most beautiful of all the beautiful that gladdened my beauty-hungry eyes on this ever-to-be-remembered voyage. Because of what I believe to be the clearing away of a haze or slight sea-fog, which had hung above the water like an ambient veil of mystery, I beheld an island which eclipsed in wild fantasy of shape, and in the romantic yet delicate gorgeousness of its coloring, any piece of landscape I had ever beheld, even in this region which seems like the concrete realization of some poet's dream of the Arabian Nights. Peak above peak and wall jutting above wall, with minarets, and domes, and pinnacles, and spires wavering and trembling through the sunset-saturated atmosphere, and seeming to be draped and decorated with banners and rugs, and streaming flags of a hundred rich and intermingling patterns and harmonies of rose, and mauve, and violet, and royal purples, that island revealed itself to me as the veritable Happy Island of all possible and impossible dreams of romance.

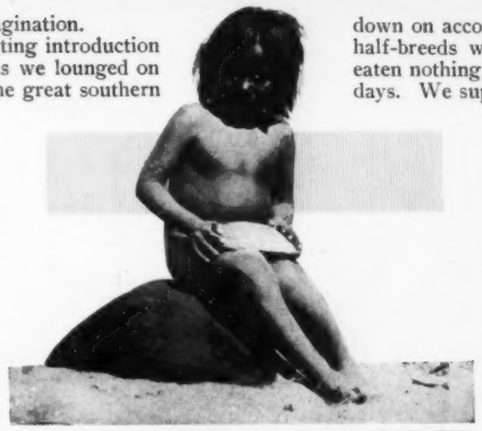
"But it's too good to be true!" I exclaimed at last. 'It is too perfectly appropriate. I'm afraid that if I should take my eyes away it would vanish."

Salisbury laughed, and said, "That's just what it'll do. You are looking, my tenderfoot friend, at a mirage."

And so it was. I have often seen the mirage in my desert wandering, but this was the first occasion when it had appeared to me at sea. And soon the marvelous apparition of that island disappeared. Just the same, I believe in it. I think it is really there, but is only open to visits from those who have been truly

initiated into the mysteries of the imagination.

The mirage, however, served as a fitting introduction to what Salisbury told us that night, as we lounged on deck under the star-studded vault of the great southern sky and told stories and talked till the drowsiness induced by open-air life carried us away on tides of slumber. He said that on the morrow we would cross the Gulf and visit the unexplored and totally uninhabited Island of the Angel Guardian. Somewhere on the southern end of this island there is supposed to be a canyon in which—wonder of wonders for this arid country!—there is a running stream of water flowing under date palm trees, and in which there repose the ruins of an ancient city of the Aztecs. An old American prospector who journeyed down the Rio Colorado from Yuma and traversed the Gulf in an open boat many years ago, is the authority for the tale. Alas! this authority is far from being unimpeachable, for this particular prospector—like many others of his tribe—practices the art of "drawing the long bow" as well, if not better, than the legitimate craft of his profession. In fact, he is such an arrant old liar that his wonderful story of adventure in the canyon of the prehistoric city has for twenty-five years been pooh-poohed and left uninvestigated. Salisbury had heard it from his own lips when he met him in Guaymas on one occasion, and was inclined to take some little stock in it. He asked me to try my luck in hunting for the canyon. And so we would up anchor at dawn and cut a sea-trail across the Gulf for the Island of the Angel Guardian.



With all our civilization, have we improved on this?

At midnight the wind sprang up and soon freshened into a gale which blew directly eastward, so that we were now tossing at anchor upon a lee shore with the anchor dragging. So long before dawn we turned the bow of the Wanderer directly into the gale and laid a course southwest by west a quarter west, which would take us to the north end of the Angel Guardian Island, to a safe harbor there, named Puerto Refugio, a distance of fifty-seven miles from La Libertad. That trip tested the seaworthiness of the stanch little Wanderer, for the wind strengthened more and more, and kicked up heavy seas, which thumped and pounded and knocked us about considerably. But we went through it all like a Mother Cary's chicken. Indeed, only once on that entire trip of some five hundred miles did our Standard engine miss a single explosion, and that was caused accidentally by an oil-can making a short circuit. Motorboating is certainly to be numbered among the exact sciences of to-day!

However, we were obliged to abandon the search for the prehistoric city. For we consumed so much gasoline in battering our way head on through the storm that we did not dare risk going the extra fifty miles out of our course which we would have been obliged to do if we had gone to the southern end of the island as we first intended. This was the more to be regretted, for the reason that we discovered the strongest kind of corroborative testimony to support the old prospector's story. This happened on the following day, when, after exploring a portion of the Angel Guardian Island, we visited Angeles Bay on the mainland of Baja, California. Here there is situated a good well of water, and a gold mine owned by an American family named Plant. We found the gold mine had recently been shut down on account of the revolution. Seven or eight half-breeds were staying at the place. They had eaten nothing save shell-fish and a few fish for nine days. We supplied them with what beans and flour and coffee we could spare, and the way they went through the meal thus provided for them was wonderful to behold! We stayed and talked with them nearly all the afternoon, and in the course of our conversation we brought up the subject of the prehistoric city. They were natives of this region, and three of them declared that they had been in the canyon, and that there were palms and water there, and a city built on the side of a mountain above the canyon. None of them had climbed to its crumbling ruins, but all positively affirmed having seen it.

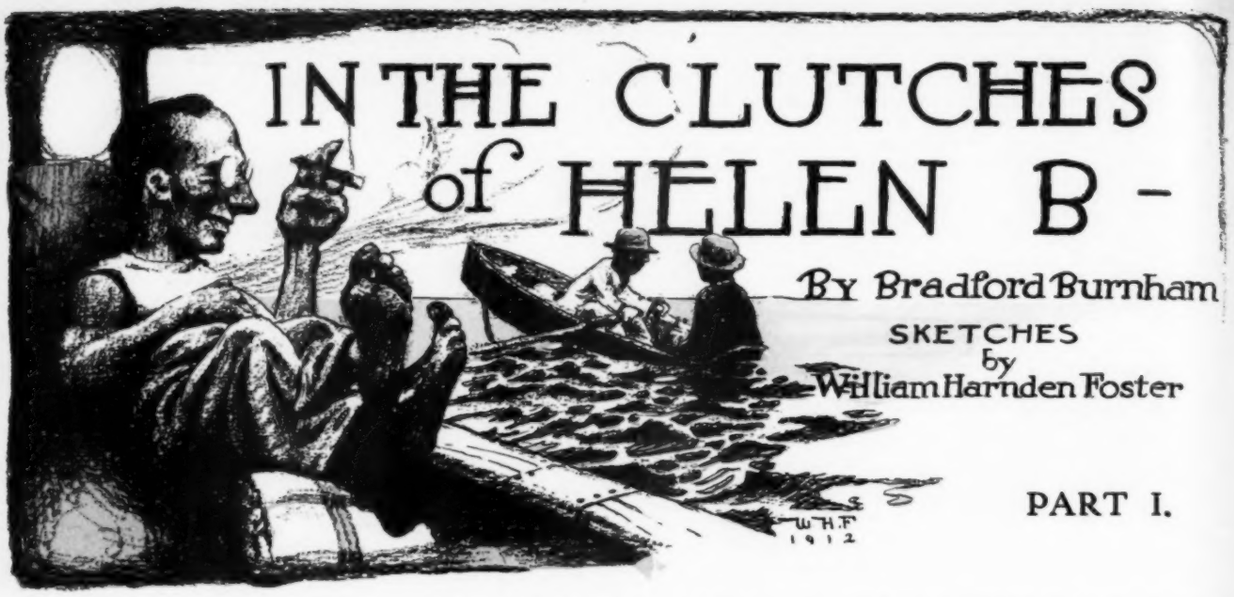
It was with deep regret that we felt ourselves obliged not to risk a trip in search of the city at this time. To run short of gasoline would be too serious a matter. We left Angeles Bay the next morning, and after visiting a number of small islands that lay in our path, and coasting a long stretch of the Baja California coast, we returned across the Gulf to Tiburon, where we pursued further explorations.

Space is lacking to detail all the hundred-and-one interesting and curious adventures and incidents which marked our homeward trail even as our outward trail had been marked. We spent some time, for example, exploring a certain stretch of Tiburon Island for evidence that would identify it with the region where a great amount of treasure is supposed to have been buried by no less a pirate than the brother of Oliver Cromwell, England's Puritan dictator, who is said to have carried on a very lively buccaneer business in the Gulf of California, and to have finally been sunk with his ship by the guns of a French frigate at Conception Bay, on the coast opposite Guaymas.

But we were obliged to give up our search and return to Guaymas. But—mark me well—me to return! Salisbury and I will once again stock the Wanderer with fuel and food and water, and thoroughly equipped for a long cruise we shall travel again the sea-trail we have marked, and discover that prehistoric city—if it is really there to be discovered—and do our best to recover the loot of Oliver Cromwell's bad boy brother!

In conclusion, let all motorboat men take the word of one who knows, that for true adventure and sport no place marked on the maps to-day can better the Gulf of California. Connecting link as it is between the unique grandeur of a barren tropical coast such as is seen in no other part of the world, and the softer beauty of the fir covered, snow capped mountains whose scenery has spread the fame of our own Pacific Coast throughout the world, the shores that border this long tentacle of the sea lack nothing that would add to the idyllic symmetry of their rôle as it was originally conceived in nature's laying out of the tout ensemble. Add to the enjoyment of this splendor the wonderful opportunities to acquire an insight into the mysterious geological processes through which the land has passed and you begin to appreciate what the country has to teach. The crew of the Wanderer has felt the spell of this wonderful country and will return.

Ship rock at a distance could easily be mistaken for a full rigged ship.



IN THE CLUTCHES of HELEN B -

By Bradford Burnham

SKETCHES by William Harnden Foster

PART I.

What is it that makes a cruise remembered and talked about long after it is completed? Is it the tranquillity that comes from the faithful engine and the clock-like regularity of the schedule? Sometimes, perhaps, but not always. The things you are proudest of and those that stick long after the others have been forgotten are the obstacles that you have overcome and the unexpected things you've encountered. Read Mr. Burnham's yarn, it's a true one, and see if it doesn't recall some similar experiences of your own.—Editor.

HER real name was Helen B. But our acquaintance had not proceeded far beyond the first stages of a growing intimacy before the original nomen with which she had been christened some time back in the Middle Ages was utterly lost in oblivion. We knew her variously as Helen Bilge, Helen Buttertub, the Horsecar, and at certain times as Hel-an' B. D——d.

In the first place, she wasn't our boat. If she had been the property of skipper, engineer, or deckhand, she would have, of course, never received such unbecoming, if appropriate epithets. Also, in all probability, this yarn would never have seen paper, for we would have taken merely a conventional cruise around the Cape and down to Maine, instead of the remarkable voyage now about to be chronicled in order to pass along the lessons learned by our experience thereon—and you will agree that it was a two weeks extremely prolific in them. Of course there is another motive for this record, it is, however, too sordid for words.

Although Helen B. was a chartered craft, the shipmates were not all complete novices—the skipper, who is personally punching this infernal machine, was the owner of the good ship Querida, about whose voyages some of you read in the January and February, 1911, issues of MoToR BoatinG. Fate cruely butted in, however, and compelled the sale of that staunch, little, open 22-footer last spring. The deckhand had also done some cruising in small boats, though some of his exploits would hardly give credence to the assertion. But the engineer! He it was who called a good, healthy second-class spar buoy a "stake," when the sea permitted him to take an interest in anything. He threatens to annihilate me, however, and to sue the publishers for libel, if I so much as mention half the truly awful achievements he accomplished ere the trip was over; yet, for the sake of posterity and the benefit of the coming race of new motor boatists, the editors and I have decided to assume the stupendous risk.

When the skipper took upon himself the responsibility of chartering Helen B. for two weeks, his natural objection to the fact that she was of the floating horse-car type, occasionally known as the standing cabin style of design, was offset by the attractive charter price, her generous size, 35 feet over all, and the fact that her engine was of a make well known and with which he was familiar—the Lathrop. We all became well acquainted with that engine before we got back. It was at all times the most salient feature on the horizon.

If you remember correctly, it was some hot the first ten days of last July on the little island of Manhattan. Thinking about the coming two weeks on the water didn't do any good as we slung ink on the respective levels of our respective skyscrapers. It only aggravated the abnormal flow of moisture and made the subway seem more Hades-like than ever. But when the time really did come for the departure and we took the Sound steamer one night for New London, the anticipation of the glorious cruise now so imminent was sweetened a hundred fold. No matter if we knew we would have to work, work far harder than many a man would think of doing for mere pay, and would be superlatively wet without and dry within; tired, hungry, and uncomfortable all at once, many, many times. In our hearts burned the irresistible wanderlust, and the fatal combination of deep yearning for things mechanical and the inherent love of the sea and crested wave—the essentials for the motor boat enthusiast. And we were on our vacation!

Helen B. was ready for us; her subtle secrets artfully hidden beneath a smile of polished brass and a newly laid piece of Brussels. Later we came to wonder how she managed to conceal so successfully such an amazing number of experience lessons with which to both torture and enrich us, and we regarded her with much awe—and other things. That any of them owed their source to any imperfections in our knowledge of motor boat pathology and things nautical never occurred to any of us, except to the tenderfoot and tender-stomached engineer whom we treated with becoming scorn. A peep beneath the floor revealed several inches of water resting gently on the keelson, but we attached no importance to it and knew not that it portended the sponge-like propensities of the Helen B. There were two big, husky pumps aboard to quickly clear out any little bilge water that might collect. Oh, yes, we got to know those big pieces of tinware like brothers before long. Other of the accessories were less robust. A consumptive looking, superannuated piece of rope, scarcely 50 feet in length, was supposed to answer for connection with a 40-lb. anchor. We supplied a new one and removed the apology. Finally we had the outfit to our satisfaction and were already badly bent, though not quite "broke"—that came later.

The forward part of Helen was enclosed with glass in orthodox fashion. Here were our living quarters. That she had no bunks

Helen B. was of the horse-car type and of a very early vintage.

was a minor matter, for we had plenty of heavy blankets, and the skipper and deckhand had cruised in open boats, and the engineer in none at all, and so we didn't mind the lack. A fresh water tank was beneath the floor, and was very handy till the first heavy weather agitated the three inches of pulverized rust that had been reclining on the bottom. Aft of the forward cabin was a cockpit with standing roof, and separated from the forward "saloon" by a paneled partition with full height door.

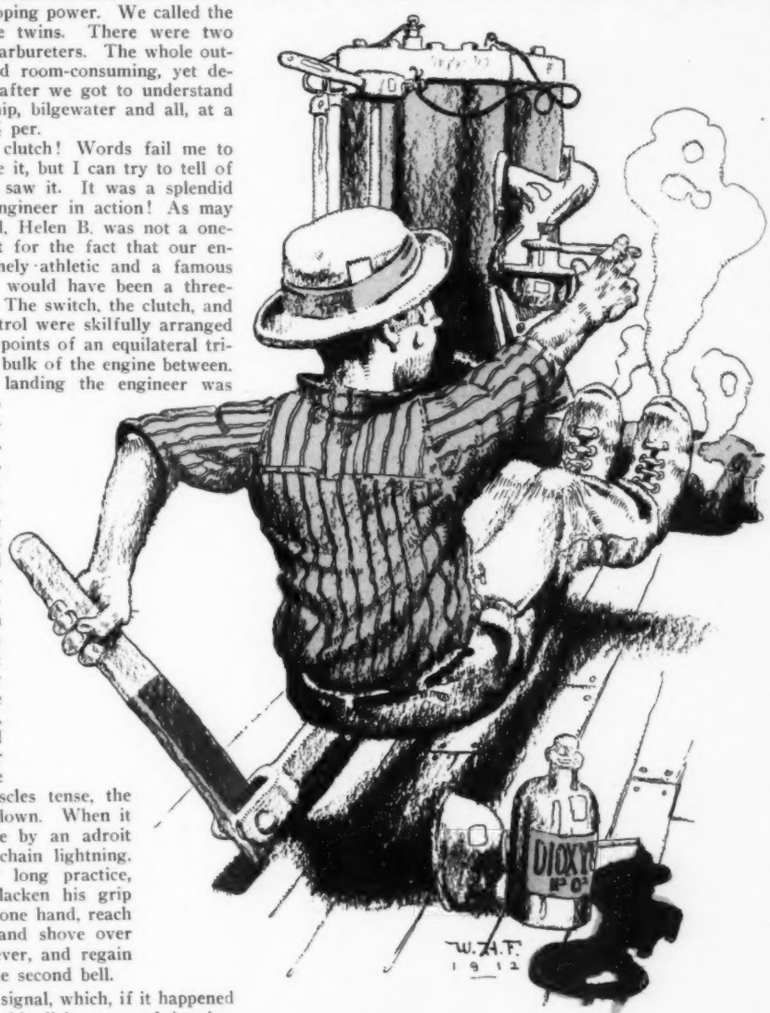
The engine was in the cockpit amidships, and deserves special attention. It frequently did. After we learned its likes and dislikes we were good friends, and it behaved splendidly, but it was a unique contrivance. It consisted of two single cylinder 7½ h. p. motors, coupled together, with a single crankshaft, and one flywheel of cartwheel size and tremendous muscle developing power. We called the thing the Siamese twins. There were two mufflers and two carbureters. The whole outfit was clumsy and room-consuming, yet delivered the goods after we got to understand it, and sent the ship, bilgewater and all, at a speed of about 8½ per.

And she had a clutch! Words fail me to adequately describe it, but I can try to tell of its operation as I saw it. It was a splendid sight to see the engineer in action! As may be readily inferred, Helen B. was not a one-man boat, and but for the fact that our engineer was extremely athletic and a famous tennis player, she would have been a three-man boat at best. The switch, the clutch, and the carbureter control were skilfully arranged so as to form the points of an equilateral triangle with the big bulk of the engine between. When nearing a landing the engineer was summarily sent to his post by a preliminary signal, usually verbal, from the skipper.

Carefully seating himself on the floor directly aft the engine and above the propeller shaft, he prepared for action by placing both feet on the aft muffler, thereby jeopardizing shoe leather. Then, grasping the end of the clutch lever above him, he awaited, with muscles tense, the one bell to slow down. When it came he was able by an adroit motion, swift as chain lightning, and perfected by long practice, momentarily to slacken his grip on the lever with one hand, reach over full length and shove over the carbureter's lever, and regain his position for the second bell.

At the expected signal, which, if it happened to be belated, would elicit roars of inquiry, force would be exerted upon the lever to throw out the clutch. But that force was infantile beside the Herculean power exerted by him upon that lever when the two bells for reversing sounded. Generally success and always perspiration crowned his efforts and with a mighty grinding the gears meshed and the screw revolved majestically in the opposite direction. At the sound of the jingle bell, the engineer would arise stiffly, throw off the switch, pour dioxogen on his blistered palms, fall on a life preserver—cork or corked—and before the final revolution of the flywheel would be deeply wrapped in the sleep of exhaustion. It was a beautiful system when adjusted, and usually worked elegantly, especially when the engineer wore a certain soft felt hat of spotless white.

Now to the story, or rather narrative, for the account is, of course, a strictly veracious one. We first made a preliminary run up the Thames River to Norwich, the skipper's home port, to take on a few dray loads of provisions and other equipment. The afternoon run down the beautiful Thames, with its graceful windings and ever-shifting views, all framed exquisitely with the soft outlines of the bordering hills, was hardly appreciated by the engineer who was hard at work studying what made the wheels go round and obtaining an elementary insight into the peculiarities and individualities of the twin motor; nor by the deckhand who was busy acquainting himself with the location of the pumps, the boathook, and the fenders; nor by the skipper who was engaged in assisting some feminine passengers in handling the wheel. As the passengers were bound for a summer port on the east side of Niantic Bay and the idea of a feminine-cooked supper followed by feminine society with rocks and moonlight was not in the least unattractive, we made this our first objective point.



It was a splendid sight to see the engineer in action.

In leaving New London, if bound west a big slice of distance can be cut off by taking the "narrow inshore channel, dangerous, and not to be attemped by strangers," to quote from the Coast Pilot. The course is indicated on the chart here reproduced. After passing the old New London light follow the shore line around to Goshen Point passing some 300 yards off the Ocean Beach pier and close in to the Point, inside the outer rock. Then you can go anywhere more than a hundred feet off shore if you draw not over four feet till you come to Two Tree Island, which, in this present age, is absolutely treeless. If bound for Niantic Bay pass through Two Tree Island Channel, being guided by two black spars, or if bound on down the Sound give it a good berth to starboard unless you can take advantage of the extremely strong tide which runs through this narrow passage.

Niantic Bay, especially at its eastern side, is not much of a harbor when there's ever so little of a southwest wind. After an evening of the character already suggested we found this out, but nevertheless toward morning we were lulled to sleep by the gentle rapping of Helen's confounded window weights against the ceiling and planking.

Our instruction had already begun, but the second day was fairly teeming with lessons to be learned. They oozed out from every quarter and filled pretty nearly every second of time. They began before the engineer was awake. A great deal happened every day before that event took place, until a brilliant idea for once filled the cranium of the skipper. Gazing pitilessly at the slumbering engineer, he would then stealthily approach the navigating bridge (ahem!) and give the jingle bell a mighty pull. Quick as a flash the engineer would spring from his recumbent position to his friend the clutch lever. Then his eyes would open slowly and the whole significance of the "infernal deception" would trickle in. It was useless to return to his blankets after that.

Fog shrouded everything that morning. However, after a last breakfast ashore, we said *auf wiedersehen* to our feminine pilot and cook, and with a great ringing of signal bells and grinding of gears the intrepid mariners moved off into the obscurity. Now it so happened that the compass had been left behind because the owner was unable to locate it at the time of our departure, and we had arranged to pick it up at New London next day if he would hunt it up in the meantime. Though the skipper was pretty well up on local knowledge of those waters, that is not much of an asset when in a fog without a compass. However, we decided to make the best of it, and proceeded daringly out in the direction of Bartlett's Reef Lightship, whose bell we plainly heard, until we *thought* we had gone far enough to clear everything between us and the new New London light, whose first-class siren was bellowing forth as though seeking to attract the attention of the inhabitants of Mars. Of course, we hadn't. Suddenly the deckhand, temporarily assigned to lookout duty on the forward deck, reported something ahead. At the same instant the skipper descried a vague shape looking like an immense chine of cream cheese would to a mouse and to us like the sand dunes in the Garden of Allah. In no uncertain language (bells be hanged!) he signalled for full speed astern. The engineer responded nobly, having done nothing but handle the clutch since getting out in the fog, and we slowly backed off from the frowning white sand hills, for such they proved to be, and when at a respectful distance threw over the hook.

After a considerable period of meditation, the fog began to lift and we proceeded on our way till the curtain rose on the second lesson. The engine began skipping. We removed the spark plugs (make and break) and then decided that as we had planned to go but to Fisher's Island that day, it being Sunday, and we had plenty of time, we might as well make a thorough job of it and give the whole power plant a general inspection and cleaning. So the "ank" was heaved over and to the gentle swishing of the bilge we got to work at the

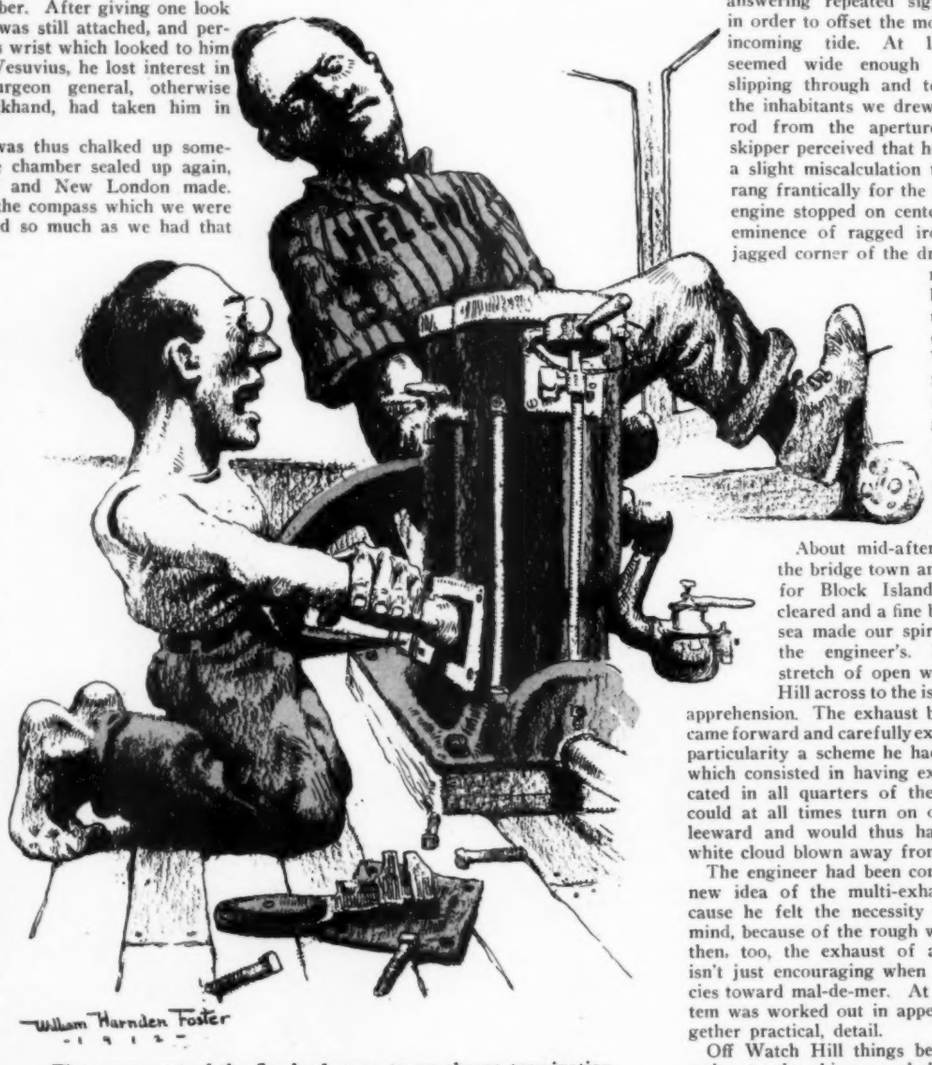
entrance to New London Harbor. Shortly afterward came the climax to the second act, with the skipper as the hero and the engineer as villain. The former was industriously swabbing out some of the oil and gasoline that had collected in the base of the crankcase with a piece of waste, having unscrewed the hand plate and managed to squeeze his hand in between the case and the bottom of the connecting rod, when the engineer suddenly decided to turn over the flywheel. He had moved it perhaps an inch when the nut of the descending connecting rod came into violent contact with the skipper's wrist, eliciting a yell from that individual's larynx which would have done justice to a Yale football cheer leader. The movement of the flywheel came to an abrupt termination, and the skipper gingerly withdrew his hand from the inquisitional torture chamber. After giving one look to see if his hand was still attached, and perceiving a hole in his wrist which looked to him like the crater of Vesuvius, he lost interest in things till the surgeon general, otherwise known as the deckhand, had taken him in charge.

Another lesson was thus chalked up somewhat painfully, the chamber sealed up again, the engine started and New London made. Here we obtained the compass which we were never again to need so much as we had that morning, and in mid-afternoon ran across Fisher's Island Sound to West Harbor, Fisher's Island. This is an ideal harbor for the small boat, easy of access, perfectly sheltered, and very quiet. Here we spent an evening of peace. No window weights banged in our ears, no waves banged us against each other, no sounds disturbed our well-earned rest.

An unfortunate glance into the bilge early next morning resulted in our indulging in some strenuous setting-up exercises with the pumps. We enjoyed the operation so much that it became a semi-daily feature of our program from then on. Have you ever tried to pump out a boat which had a standing roof with a pump so long that the plunger when raised always bangs your hand against said roof? That is, if you stand on the seats so as to give the plunger a long stroke, and incidentally have to double up your shoulders and tuck your head in somewhere below them. If you stand on the floor and essay the task you can only take a short stroke unless endowed with arms four feet long, and the job becomes even more wearying to the flesh. Then when you have "spelled" each other *ad infinitum* you give an especially savage jab to the plunger and the water spouts up like Old Faithful Geyser and cascades down your neck and chest. We decided Tantalus had an easy job compared with us, who apparently had to pump most of New London Harbor into Fisher's Island Harbor. Next day Fisher's Island Harbor went into Block Island ditto, and so on, each succeeding day. This got to be a kind of mystic rite with us before we got through; and as a result we all mentally advocated the installation of power bilge pumps into our own future craft, or else a self-bailing bilge.

We decided to run across to Mystic, the home of the Lathrop, that day before going on with the cruise and have a few little odd jobs attended to. In spite of thick fog we got there without mishap. By the way, if a motor boatist is so unfortunate as to have to wear glasses all the time, as this one is, he can manage in fog very well if he shakes a little fine castile soap dust on the lenses every now and then. It seems to be very efficacious in keeping off the mist.

Two drawbridges span the approach to Mystic. The first, on which the railroad crosses, operates by power and hinders progress but little. The second is a different matter. Across this bridge rolls and walks all the traffic of the metropolis. To check this surging tide of humanity by opening the bridge is a big and unusual event. Also it is a great consumer of time. At low water a mastless boat can often skin under it when closed. It is therefore better and quicker to wait for low water. We were ignorant of this fact, however, and whistled and horned lustily for the bridge to be opened. Thereupon the populace of Mystic quit work and gathered at the bridge. Flagmen were dispatched up the road in both directions to stop approaching trolleys, while teams and automobiles were served in like manner. Meanwhile the draw remained stationary in its offices of connecting link.



The movement of the flywheel came to an abrupt termination.

Hope was about abandoned of reaching Lathrop's before closing time when in response to our continued appeals one lone bridge tender appeared at the rail and signalled inquiringly as to whether it was our desire to go through. Then, when firmly convinced in the affirmative, he retired for a half-hour, finally to emerge bearing a mighty bar of wood. This he inserted somewhere in the anatomy of the structure, and calling to his aid, a barefoot newsboy of the town, the two spat on their hands and placed their weights upon the bar. At first there was no response, but finally, an inch of space appeared between the draw and the more stationary portion. This gradually increased to a foot and then to a yard. All this time the engineer had been busy answering repeated signals to reverse in order to offset the motion of the fast incoming tide. At last the space seemed wide enough to permit our slipping through and to the cheers of the inhabitants we drew near. About a rod from the aperture, however, the skipper perceived that he had committed a slight miscalculation to creep in. He rang frantically for the reverse—and the engine stopped on center! A frowning eminence of ragged iron, marking the jagged corner of the draw tore into the roof of Helen, but she curtsied under and the damage was nil. We were through the draw! Immediately we began signalling for it to reopen for our contemplateed return some two hours later.

About mid-afternoon we cleared the bridge town and laid our course for Block Island. The fog had cleared and a fine blue sky and bluer sea made our spirits glad. All but the engineer's. He viewed the stretch of open water from Watch Hill across to the island with no little apprehension. The exhaust bothered him. He came forward and carefully explained with great particularity a scheme he had just formulated which consisted in having exhaust escapes located in all quarters of the boat so that he could at all times turn on one which was to leeward and would thus have the perfumed white cloud blown away from him.

The engineer had been concentrating on the new idea of the multi-exhaust, possibly because he felt the necessity of occupying his mind, because of the rough water ahead. And then, too, the exhaust of a gasoline engine isn't just encouraging when you have tendencies toward mal-de-mer. At any rate, the system was worked out in appealing, if not altogether practical, detail.

Off Watch Hill things became more interesting to the skipper and deckhand and less interesting to the engineer. That narrow back door to Fisher's Island Sound is decidedly famous for its wanton antics and the bell buoy there is an extremely restless one. About this time the deckhand suddenly expressed a desire to steer. He was told the correct compass bearing for the invisible island and given the wheel. But the needle was a decidedly animated little piece of steel just then and the deckhand had some difficulty in following its gyrations with the wheel. The game got so interesting that he didn't consider the direction he was going, so intent was he to catch the needle. The poor engineer happened to raise his ashen countenance about this time and his face immediately underwent a transfiguration, for ahead of him appeared the land.

"Block Island?" he queried rapturously, "So soon?"

Deckhand and skipper looked up at the astounding news and saw ahead of them—Watch Hill—which they had but a few moments ago been pointing the rudder at. The skipper took the wheel.

The passage across was without further incident. Once clear of the Watch Hill cross-currents a regular corkscrew swell assailed the quarter coming in from seaward, but it was long and even and harmless. The monotony was broken once by the report that the engineer was suffering from a severe hemorrhage of the stomach; then we remembered that he had eaten about a quarter of a watermelon just before leaving port. We were all glad to get within the fine harbor of Block Island, however; the skipper, because it marked the close of a good day with consequent peace and rest; the deckhand, because of the thought of some one in white skirts waiting for him at one of the cottages; and the engineer—for obvious reasons.

There were not many boats as small as we in the harbor. The run to this interesting little isle is a comparatively easy one, the distance being but 14 nautical miles from Watch Hill and the course to the new harbor SE by E from Watch Hill light. Yet most of the inmates of the harbor that night were sloops and yawls with a steam yacht or two. Most of the yachts anchor well up toward the pier on the west side of the harbor, but the bottom is pebbly here and the holding qualities consequently very poor. Across on the other side of the horbor it is better.

We spent two nights at Block Island. We intended to all along, and it is probable the deckhand meant to stay longer. But we didn't intend to put in the intervening day in the manner we did. Early in the day a fresh NW breeze sprang up and we began to drag anchor for the reason stated above, as we had already gone through our sunrise pumping ceremony, we knew there was plenty of water in all parts of the harbor and decided to seek a more sheltered nook. But the engine seemed to have become infected overnight with the attributes of a mule, and refused to start. Exhaustive and exhausting efforts with the flywheel were useless while we dumped the contents of the priming can into the cylinders. Prayers, pleadings and petitions were wholly ineffectual. Savagely we all went after the tool-box and upset it in the bilge.

After long and patient toiling, however, the cylinder heads were removed. Breathless with suspense our heads bent over the edge and found—the walls wet with water!

"Did you put that water in there?" yelled the skipped to the deckhand, ignoring the engineer with scorn. But the deckhand was up forward somewhere and murmured something about having a date ashore. Presently he appeared before the grimy, oil-dripping skipper and engineer, beautifully arrayed in summer hotel piazza finery and calmly asking us to deposit him on shore. Knowing that he would depart with the tender by himself if we didn't, a recess was called while the skipper set him on the desired shore.

Returning to the problem with renewed vigor the cylinders were wiped dry, the heads replaced, and the engine started. A few snorts resulted, followed by a more continued series of grunts. But they were born only to die, and on opening the pet-cocks water shot forth as from one of New York's high-pressure hydrants. Was there any place on that tub that was free from water? We had become somewhat reconciled to the fact that enough water to make the Sahara Desert blossom like the rose daily made its way in through some

"Did you put that water in there?" yelled the skipper to the deckhand.

tremendous hiation in the lower regions of Helen B's anatomy. But that it should penetrate to the inmost recesses of the engine was more than we could stand. So we sat down.

Four times the cycle was repeated—cylinder heads removed, walls wiped dry, heads replaced and engine started—only to stop choked with water. Finally a scientific test was made. The pump was disconnected and the water-jacket channels drained. Then the four-cycle operation was repeated once more. The result was the same. Victory! that fleeting phantom, was finally sighted. The test showed that the water backed up through the mufflers! Whereupon the valve for letting water through the exhaust pipe was closed and for the thousandth time the engine was started. It ran! ran till the paint smoked and simmered; ran, actually, till stopped. 'Twas wonderful!

Wearily we connected the pump, assembled the tools, shed our oil-soaked garments and plunged over the side for a revivifying swim. Then we arrayed ourselves in a manner to far outshine the deckhand and bent on reparation for that individual's enjoyment of a day so full of toil for us, by busting a monopoly, we rowed ashore and made our way toward the cottage which he had sought early in the morning. On the engineer's blond locks the white felt hat nestled snugly.

The next day we decided, after holding a council of war, on one of two courses: either we should hire a relay of boys to continuously perform the pumping ceremony, or we would run across to Newport or Providence and haul out and see whether or not the builder of Helen Bilge had forgotten the garboards. We decided on the latter. We had grown weary of looking at the bilge but that morning one of us, out of habit, peered beneath the floor and jumped back with a start of surprise. Instead of the usual mud-colored water a mysterious white met the eye. We knew not what it meant—until the cook, opening the icebox to get the milk for breakfast coffee, noted that the cow was standing on her head. The icebox drained into the bilge.

After propitiating the water gods once again with the pumps, we chugged forth. The run across to the mainland was an ideal and eventful one. It is not often, I venture to assert, that one encounters in a run of nine nautical miles, thirteen battleships, a fleet of torpedo boat destroyers, a school of submarines, a whale and several acres of bluefish so closely packed that the surface of the water looked like a miniature tide rip and teemed with the jumping myriads. A steam yacht was on the scene, tossing gaily on the lumpy sea, while those on board were pulling in the fish as fast as they could wield the lines.

Gently reproving ourselves for not having on board so much as a bent pin and rag for enticing the blues, we kept on and soon left them behind. Then, not long afterward, we discovered the cause of the piscatorial perturbation. A stream of water shot up like a small geyser not far away, and a huge glistening gray object, miles long, apparently appeared above the surface, descried a graceful arc, and shot away in the direction of the school of blues.

"Ye gods!" ejaculated the engineer, and forgot his clutch.

"Look, look!" yelled the skipper, pointing to where a trio of little white spurts of water shot up above the surface. "More of them!"

But, no. Unlike the first one, these were followed by jets of blue smoke, and we knew that not whales but the Diesels of some submarines were responsible.

(To be concluded)

FITTING OUT

Practical Suggestions for the Man Who Does the Work of Putting the Boat and Her Power Plant into Commission for Another Season Afloat.

By Captain Joe.

IT is to the skippers of the "mosquito fleet" that these timely hints and suggestions are chiefly directed, for to keep the boat shipshape from stem to transom requires some little labor and care, and to arrest decay and prevent depreciation of the craft, the entire boat should be thoroughly overhauled at the time of fitting out.

If the boatman takes pride in the ownership of his craft and has well looked after its condition when hauled out for the winter, the arrival of spring will find the boat in good shape and the labor of putting her in commission will mostly consist in painting, overhauling the motor and electrical equipment, and making the few minor repairs and alterations made necessary by ordinary wear and tear.

As the work proceeds more smoothly, with less effort, and is more thoroughly done if methodically attended to, the first and preparatory step towards getting the boat in cruising trim, is a thorough cleaning. The first warm day should therefore be taken advantage of to remove the covering boards and canvas housing, and air and dryout the boat's interior. Having been closed up during the winter season, every craft is sure to gather dampness or sweat to some extent, and cabin doors, skylights, hatches and lockers should therefore be opened wide to admit the sunlight and fresh air. The boat should then be stripped of everything easily removable and loose dirt which has accumulated on deck and in the cabin brushed out.

The work of cleaning may now be completed with the aid of plenty of hot water, soap and elbow grease and the boat made sweet and clean right down to her deadwood and timbers and in prime condition for applying the protecting coat of paint. The old boatman, to whom the noisome smell of bilge water is a sure enough indication of a poorly manned craft, will invariably begin cleaning at the bilge, and the amateur sailor will do well to follow the sea-dog's example. If the boat is ballasted, this must be removed, and to facilitate replacing the ballast it is a good idea to mark each section as it is taken out. Neglect to do this, will cause no little trouble in placing the ballast so that the boat may float at its proper water line.

Lead is of course the ideal ballast, being compact and clean, but iron is more often used because of its lower cost. As iron will rust and so make a rusty bilgewater, which will stain the painted work every time the pump is used, the boatman should keep the ballast from oxidizing. Tar is sometimes used, but a common red lead or oxide paint is much the best for this purpose, since it adheres well to the rough metal surface and effectually prevents further rusting.

The problem of refinishing the interior of the cabin is easily solved, but to paint the exterior of the motor boat involves much more labor, and some little care must be taken to get a smooth and attractive surface. It may be stated at the outset, that outside painting is quite different from inside work, and as a boat is subjected to more or less hard wear, the work of restoring the outside of the hull should be carefully attended to. Painting as done by the average layman is not generally all that could be desired, and the rough brush work of the amateur is generally due to the use of unsuitable paint and brushes, as well as a too hurried endeavor to get the boat into commission. Although painting requires a moderate degree of skill, the pigment and the brushes are the all important factors to be considered, since even an old hand would find it practically impossible to turn out an attractive and desirable job by using cheap paints and flabby or stubby brushes.

It should therefore be self-evident that there is some little preliminary work to be done before the paint can be properly applied, and if the old surface is rough, with much flaking paint, the only way to restore the boat to its original smoothness is to scrape off the old paint down to the wood. For doing this work, a painter's gasoline torch is often used to blister and soften up the old shell, but for the amateur's use one of the patent chemical paint and varnish removers is preferable, as in this case no skill is necessary; the liquid being simply brushed on over the old painted surface, which so softens it that the old layers of hard pigment may be scraped off easily.

When all the old paint has been removed down to the water line, any rough spots in the wood due to swelling planks, etc., should be smoothed out with a plane, exposed nail heads and rivets filed down flush, and seams and dents filled up with putty in which a little white lead has been mixed.

If the boat's sides are in fairly smooth shape and it is not thought necessary to scrape off the old paint down to the wood, the boat should be gone over and any loose flaking paint scraped off and the edges smoothed down by sandpapering. When cleaned these bare spots should be touched up with a couple of coats of a white lead and oil primer, allowing the first sufficient time to become dry before touching up for the second time. Deep scratches and nail holes should be puttied up flush, that the surface may be made as smooth as possible before painting.

If the boat leaked the previous year, the old caulking should be removed and the leaking seams recaulked. As it requires some little skill to caulk a boat properly, the amateur should not hurry at this stage of the overhauling job, but take plenty of time to do the work carefully and well. In the first place the old caulking material must be cleaned out of the seams. For small boats, an old case knife will be found a convenient tool, while for larger craft, the regulation reefing-iron is used.

For caulking twenty-footers and other small boats, common candle wicking is used, and since craft of this length have quite tight seams, a caulking wheel is a useful tool for laying the material in small seams. For larger motor boats spun cotton is used. This material resembles the ordinary cotton, but comes in skeins especially for boat work. The "5-ply Yacht" cotton is preferred to the "Navy" brand, and the skeins should be divided in the proper size for the seam, and then rolled up into a ball for convenience in handling. Oakum is only suitable for 60-footers and other large craft and should not be used for caulking lightly planked boats.

To caulk a boat, commence at one end of the seam and with the wheel or mallet and caulking iron, force the cotton into the seam. The caulking material should, of course, be tightly driven into the V of the seam, but too great force had best be avoided, especially when working on old boats where the planking is likely to be soft in spots, and where much force is apt to drive the cotton right through the seam.

When it has been nearly filled with cotton, the caulked seam should be brushed over with white lead and oil and the opening neatly filled flush and smooth with putty. The hull is now smooth and ready for the paint and as "there are paints and paints," the boatman must use

due discrimination regarding the choice of suitable pigments for the work in hand.

The amateur has the option of two methods and may either purchase ready-mixed paints, or buy the stock and mix up the pigment according to the character of the work to be done. For the average owner who does his own boat work, the ready prepared paints are more convenient, and where but little spare time is at command, this is the method generally adopted. It is important to use good paint, however and as the ordinary kinds of ready mixed house paints are certain to crack and peel under the influence of weather and the unavoidable hard knocks which every boat is subjected to, only the highest grade and well-known brands of yacht white or black should be selected for restoring the boat. Outside enamel paints are not to be recommended for the top sides of the hull, owing to the fact that they dry so hard and brittle and while making a very attractive, glossy surface, their use is only advisable upon fancy finished, high-priced craft, where expense is not an important factor, and the work of keeping the boat in the pink of condition is entirely done by shipyard hands. Ready mixed paints always should be well stirred before they are used.

For mixing up paint for the outside of the boat, only the best grade of keg lead should be used, and the lead must first be well worked up into a paste with linseed oil and then thinned down with pure turpentine. If the boat has been scraped down to the wood, the first or priming coat should be thinned with oil only. The writer much prefers to use a turpentine paint for finishing the hull, as it is more flexible than hard drying paints, and being practically immune from flaking and peeling, the boat's sides are always smooth and it is unnecessary to scrape the craft every year or two. Good painting cannot be done with thick paint and if the boatman would have a nice finished craft he should brush on at least three moderately thin coats, letting the under coat become thoroughly dry before applying the next.

As good painting cannot be well done with cheap brushes, the boatman should make a good beginning by purchasing a few first quality brushes before beginning work. In selecting brushes, it should be remembered that the best and only really satisfactory kinds are filled with white or gray mixed Russia bristles, strongly bound with brass. A good brush is long of hair with thickly set bristles, while cheap brushes contain black China bristles, are short in the hair, thinly set and poorly bound in tin ferrules. Good brushes cost much more, but as a really good tool will last for several painting seasons if kept clean and not allowed to dry out full of paint. A three and four-inch flat wall brush for plain outside work, a two-inch flat brush for smaller painting, a beveled edge varnish brush, and one or two beveled edge sash brushes will be found a good outfit. A cheaper brush may be purchased for the copper paint, and this, as well as the varnish brush, should be used for their respective purposes and for no other.

The boat below the waterline should be sandpapered smooth and if the waterline itself is not distinctly marked it should be cut in. This detail is not always done in the boat shop, but the boatman will find it an aid in painting if the line is well marked with the tang of a file. This is, of course, better done before beginning to paint.

To prevent marring up the outside white, it is a good plan to finish up the decks and other parts of the boat before brushing on the last finishing coat of white. For cabin top, cockpit and other painted surfaces which are much used, a couple of coats of some light, cheerful color, as light brown, light gray, or dark straw color, are most suitable. Dark colors are apt to be spotted with water, are less attractive, absorb more heat and make it more difficult to get about when voyaging at night. In mixing up paints for wearing surfaces, a larger amount of oil is needed to keep the paint from rubbing, and a very little dryer may be added to ensure a quick and hard drying coating.

For the trim and other parts which are to be finished in varnish, the old finish should be removed by scraping down to the wood. The use of the paint and varnish remover will here lighten the labor. If the bright work is of mahogany, scrape and sandpaper smooth. Cedar and oak may be bleached with a solution of oxalic acid or muriatic acid in the proportion of one part acid to three of water, but vinegar should be brushed on afterwards to prevent the varnish from flaking off. All bright work should be well sandpapered with the grain of the wood, never crosswise, and the surface must be clean and quite dry before the varnish can be applied. As varnish will become thick and "gluey" when cold, this work should be done on a warm, bright sunny day, and the varnish must be well brushed out. At least three coats of high grade outside spar varnish should be used, and each should be allowed to dry well before brushing on the second coat.

The bottom of the boat should be protected with a couple of good coats of copper composition paint to prevent fouling. There are many good paints upon the market, but so far as the writer's experience goes, a perfectly weed and barnacle proof paint has yet to be made.

However this may be, some kind of an anti-fouling paint is necessary to preserve the wood, for ordinary paint affords no protection from worms and quickly becomes foul with barnacles and ribbon weed. Many boat shops use a composition of their own manufacture, and if the boatman desires to mix up his own copper paint, he can use with confidence the following receipe: Red Lead, 2 lbs.; Copper Bronze (powder), ½ lb.; Arsenic, ½ lb.; Paris Blue, ½ lb.; Chrome Yellow, ½ lb.; Patent Dryer, 2 pts.; Linseed oil, 2 pts.; copal varnish, 2 pts. These ingredients should be thoroughly mixed together with the paddle and thinned to brushing consistency by adding varnish. It dries with a good gloss and of a neat reddish copper shade, is durable and comparatively inexpensive to mix up.

The application of the composition paint is done after the finishing coat of white is dry, and the waterline mark should be carefully "cut in" with the flexible tip of the brush. A nice clean cut waterline is essential for an attractive exterior and if this detail of the work is slovenly done it will quite spoil the natty appearance of the boat. To prevent the heavy minerals from settling to the bottom of the paint pot, copper paint must be stirred at frequent intervals as the work of painting proceeds, and the paint well brushed out.

When the painting is finished, the paint should be removed from the brushes by washing them in turpentine or kerosene, shaken dry and then wrapped up in newspaper and stored away for another season's use. To prevent the odds and ends of paint from drying up, they should be poured into a can just large enough to hold them, or a thin film of oil may be poured on and the tops of the pots covered with newspaper to keep out dust and prevent the oil from drying out.

THE MOTOR.

The motor and complete electrical equipment should be conscientiously overhauled before the boat is put in commission, and the entire power plant should be taken down, thoroughly cleaned and any needed replacement, repair, or adjustment attended to. In the beginning the work of overhauling, the motor should first be stripped of carbureter, magneto, fuel and water pipes, lubricators, etc. The anchoring bolts which secure the cylinders to the crankcase may be removed and the cylinders pulled off with their pistons in a vertical position. The cylinders may now be removed for cleaning. Kerosene will cut out the old oil and soften up the crust of carbon so that it may be more readily removed by the scraper.

The pistons may now be taken from the cranks by uncoupling the big ends

Although not always necessary, a thorough overhauling of the engine is the best precaution against trouble later on.

If you have been troubled with a leaky deck or are tired of the holy stone, canvas it—it's the best solution of the problem.

of the connecting rods and in doing this, the boatman should not neglect to punch or file a check mark on each piston head as it is taken down. If this is done, the pistons will be correctly assembled in their proper cylinders, which is essential to insure good compression. The piston rings should be looked over, and if black "blow marks" are discovered running across the bearing faces, the worn rings must be renewed. The wrist, gudgeon or piston pin should be examined for wear, and if the set screw is not enough to secure a tight fit, a new pin should be inserted.

If the motor is of the two-cycle type the gastight packing ring at the base of the piston should be looked over, to determine whether the gas is leaking from the base. The rings should next be snapped from their grooves and the whole piston assembly given a good cleaning with kerosene or gasoline. If the connecting rod bearings are much worn and have considerable play, the desired adjustment may be secured by filing off a little metal from the flat faces of the removable caps. This work must be very carefully done, however, and some pains must be taken to file the surface flat and true, or the bearing will be loose at one side and pinch and bind at the opposite end.

Wear in the main or crankshaft bearings is confined to the lower halves of the bushings, and if these are found much worn new bushings should be put in. In many cases, the shaft itself is worn oval and this must be trued up, a job which can only be properly done by a good machinist. If the bearing is rough and deeply scored, it must be worked up smooth by scraping, and as work of this kind must be very carefully done to obtain a proper fit, the boatman who desires to fit his old bearings should procure a set of scraping tools. To work up a bearing, the new hand should proceed carefully and scrape away but a very little metal at one time, repeatedly trying the journal for a snug fit. As it is difficult to get a smooth bearing by indiscriminate use of the tool, the strokes of the scraper should overlap one another, letting the second stroke smooth out the ridge left by the first stroke of the tool. A little blueing or red lead and oil brushed over the bearing surface will indicate the rough spots which must be scraped down as smooth as possible.

After scraping is finished the bearing should be cleaned, lubricated and carefully adjusted. In adjusting the crankshaft bearings it should be remembered that the "fit" is dependent upon three factors: the size or diameter of the journal, the speed at which the shaft is run, and the work which the bearing is called upon to perform. These important considerations must be observed, and in the factory the assembly room makes an allowance of about .002 inch play for every inch in crankshaft diameter, and the adjustment should never be less than this amount. Of course, too much play in the shaft will cause wear and make the motor noisy in operation, while if the shaft is too tight and pinches the engine is made stiff and cramped and cannot develop anywhere near its full rated power.

If the motor is of the four-cycle type, the inlet and exhaust valves require overhauling and should be ground in to make a good gastight fit on their seats. If they are found to be very rough and much pitted, dress the faces with a flat mill file before grinding. For valve work, various abrasives, as emery, carborundum, powdered glass and pumice are used. Emery or carborundum is preferred by the writer, but whatever the medium employed it should be quite free from grit and finely ground.

In using emery and carborundum, a small quantity is mixed up to a paste with oil or vaseline and thinned down as required with kerosene. Pumice is, of course, used with water alone. Before grinding it is well to take the precaution of inserting a wad of waste in the part leading to the cylinder, thus preventing any possibility of the mixture from entering the cylinder. The valves are ground on their seats by applying a little of the mixture on the metal faces and rotating the valve back and forth by twirling the handle of the screwdriver between the palms; or, if found more convenient, a drill or bit brace with screwdriver bit may be used for this purpose. In any case, the boatman will find that a comparatively small amount of the grinding mixture will grind faster and much smoother than a larger quantity of thick paste. When grinding, the valve should be given a few turns in one direction, then lifted up, turned partly around in its seat, and again rotated in the reverse direction. This little "knack" will prevent balling up of the cutting medium and so prevent scratching the metal surfaces. When through grinding the faces of valve and seat should appear as a continuous polished band and be quite free from score marks and scratches. The metal should then be cleaned with gasoline to remove every bit of the grit.

The gasoline tank should not be overlooked at this time, and any sediment should be washed out by flushing with a good strong solution of sal soda (common washing powder) and water, then given two or three rinsings with clean cold water. The fresh-water tank should be treated in the same fashion, which will cut out the old slime and make the tank as sweet and clean as new.

The lubricator, grease cups and all lubricating pipes or leads which feed the oil to the various bearings should be removed and cleaned out by forcing gasoline through them with a gun, that all passages may be clear and unobstructed.

The reverse mechanism requires attention also, and the clutch and brake bands should be cleaned with gasoline. The working parts should then be well lubricated, and the levers adjusted to take up any play caused by wear, and keep the brake band from dragging on the drum.

THE ELECTRICAL SYSTEM.

In overhauling the electrical plant the coil, magneto and wiring layout should be systematically gone over. The wiring should be examined for worn insulation and tested for broken inside wires, and any weak thin spots in the insulated covering either wrapped with tape or, what is better, replaced by a new length of cable.

The contacts or platinum vibrator points of the spark or induction coil, should be cleaned, trimmed up and readjusted. The vibrator points are easily trued up by means of a thin, flat and dead smooth jeweler's file. Do not attempt to use a machinist's file for this pur-

An object lesson—The use of a stiff brush and a pail of water when the boat was hauled out would have saved the labor of removing the dried barnacles in the spring.

A characteristic spring scene. There is always plenty of expert advice at such times. Note the size of the motor compared to that of the advisory committee.

pose. In adjusting the tremblers they should be tuned up to a moderately high pitch, as the best coil service can only be had when all the tremblers of the separate units are adjusted as closely alike as possible. This matter should be well done, and a special delicate coil ammeter is a very handy instrument for making this important adjustment. The points should be adjusted to draw just the amperage recommended by the maker. Directions for keeping the coil in shape are generally pasted within the lid of the coil case, most coils doing best on some 5-10 to 6-10 ampere of current consumption.

The timer or commutator should be cleaned out with gasoline to remove the old grease and dirt that is likely to prevent a good and positive contact. It should then be packed with fresh grease or lubricated with oil as required.

The magneto should not be completely dismounted, and the magnets should not be disturbed, as it will probably only require a little cleaning. One of the points of probable wear is in the interrupter contact roller arm. The contact interrupter spring may also become weak through much service and so cause misfiring. The armature bearings will also work loose in time, and cause misfiring of the motor by making a short contact. Dust and dirt on the face of the distributer should also be removed, for it is important to keep the insulated face quite clean.

The carbureter should be cleaned out, and the filter cleaned of any grit and fluff which may have worked down from the tank. It is not advisable to alter the adjustment of the mixture, however, as this part of the power plant can be cleaned without disturbing these adjustments.

A good job of overhauling in the spring is the best insurance against trouble later on.

How to Design a Motor Boat.

Displacement, Weights and Trim—The Third of Four Articles Presenting the Fundamentals of Motor Boat Designing in the Simplest Non-Technical Terms.

By L. B. Chapman.

You are probably waiting for this instalment and an introduction is unnecessary for those who have read the other two. For those who haven't, we'd like to say that we believe this series of four short articles will give the non-technical reader a better working knowledge of motor boat designing than he could possibly obtain from the average text books on the subject.—Editor.

WE have now learned how to lay-out and fair-up a design and are ready to make the final calculations of displacement and trim. First of all we will turn our attention to a few preliminary considerations which are needed for our work.

A great many of the calculations of a boat designer are finding the areas of irregular curves; that is, figures bounded by lines such that no formula can be applied, as Figures 16-19.

There are two ways that this may be done; either by applying a rule that has been found to be more or less correct or using an instrument such as a planimeter or integrator. Naval architects and those doing a good deal of this work use the instrument method a good deal, but, nevertheless, the rule method is frequently used. As these articles are written for the amateur who desires to design only a boat or two for himself the use of these instruments is out of the question. It is enough to say that in using them one traces the outline of the figure in question and reads the area in square inches on a dial. The planimeter measures areas alone while the integrator measures areas and moments. For a more detailed description of these instruments I will refer the reader to any text book on naval architecture.

The rules that I am going to present are nearly as accurate as the instruments, their only fault being that they take a little longer to use.

Let us turn our attention to Figure 16. Suppose we wished to find the area of this figure. The first thing to do is to divide the area up into a number of parts equally spaced as shown. Any number of convenient parts can be used, depending on the size of the figure; the smaller the divisions the more accurate the result. In this case I have taken seven parts (a, b, c, d, e, f, g) as shown.

There are a great many rules in use, some more or less complicated. One of the simplest and most accurate is the following, known as Durand's.

(1) $A = s\ (0.4\ a + 1.1\ b + c + d + e + 1.1\ f + 0.4\ g)$ where A = the area, s = the distance between the divisions (or stations) and a, b, c, etc., the height of the various ordinates. This rule holds for any number of divisions not less than four. The first two and the last two always remain the same; where we have three middle ones, c, d, e, we might have one or any number we wished. To apply this rule we divide up as shown, measure with a scale a, b, c, etc., and take 0.4 of (a) and (g) 1.1 of (b) and (f) and the whole of the rest, add them all together and multiply by (s) the common distance between. The result is the area desired.

This rule may be applied to an area as Fig. 19, where the end ordinates are zero. The rule then becomes:

(2) $A = s\ (0 + 1.1\ b + c + d + e + 1.1\ f + 0)$. Again the rule might be applied to Fig. 18, where one ordinate is zero.

(3) $A = s\ (0 + 1.1\ b + c + d + e + 1.1\ f + 0.4\ g)$.

Another rule, perhaps a little quicker, is the trapezoidal rule.

(4) $A = s\ (\frac{1}{2}\ a + b + c + d + e + f + \frac{1}{2}\ g)$.

This is not used for work where great accuracy is desired but is very useful in many cases, especially when one is designing for a certain displacement and wants to make quick calculations from time to time as the design progresses. This will be shown later in Part IV. As before, this rule may be used where one or both end ordinates are zero.

In the later case the rule resolves itself into simply adding the ordinates together and multiplying by the common distance between.

To be able to find the center (the center of gravity or balancing point, if of cardboard) of one of these irregular figures is also very essential and fortunately very simple. If we wanted to find the center (c. g.) of a group of weights, as Fig. 20, we would find the moment of each weight about some point as "o" and divide the sum of the moments by

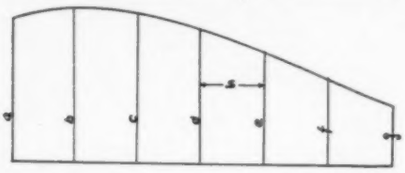


Fig. 16

To find the area of this figure divide up as shown and apply Durand's rule.

the sum of the weights. That is, we would multiply each weight as a, b, c, etc., by its arm (distance from o), add these products (moments) and divide by the sum of the weights (a, b, c, etc.). The result would be the distance to the center of gravity. If a, b, c, etc., were areas instead of weights the method would be the same. So in finding the center of a curve we take the height of the various ordinates and multiply them by their distance from some fixed point (generally at one end as "a") and divide the sum of these moments by the sum of the ordinates. The result gives us the horizontal distance to the center of the figure. The common way is to apply the rule to the moments as to the ordinates. We then have M (moments) instead of A. This will be made clearer when we take up an example of the application of the rule.

The first problem that confronts the designer on completing the lines is the determination of the displacement and the location of the center of buoyancy (CB). Perhaps some of the readers may not be particularly interested in the displacement, but the center of buoyancy must be located definitely in a fore and aft direction for the purpose of trim and this necessitates a determination of the displacement. Besides this, one knows nothing of boat designing until he understands the form of the displacement curve or curve of areas as we will see next month.

Displacement, as we all know, is the volume of the underbody generally expressed in pounds (1 cu. ft. = 64 lbs.) We all know how to find the volume of familiar solids which involve length, breadth and thickness. The same method applies to the underbody of a boat, but unfortunately a boat is a rather complicated figure. We have just seen how to find the areas of irregular curved figures by applying a rule. Now a boat's underbody is nothing more than one of these curved figures, but with three dimensions instead of two. We can apply our rule as before, but instead of having liner ordinates (a, b, c, etc.) we have areas of stations (1, 2, 3, 4, etc.) If we knew the areas of the various sections of the boat (shown in Fig. 1) we could quickly apply our rule, letting area of station 1 = a; area of 2 = b and so on, and s equal the distance between stations. The result would be displacement in cubic feet. We start out by applying rule (3) to the different stations one at a time. Note Fig. 18. This is station 6 taken from the body plan of the design Part I. The portion between the L. W. L. and the rabbet line is divided in seven parts (five might do as well) and the rule (3) applied as follows: (In a curve, such as Fig. 18, when the curve is very sharp and the area small the stations should be spaced close together as I have shown here)

EXAMPLE I (FIG. 18).

0.4a	....
1.1b	1.37
c	1.92
d	2.41
e	2.75
1.1f	3.39
0.4g	1.30
	13.14

13.14 × 0.285 × 2 = 7.489 sq. ft. The 2 is used for two sides, only one side being found by the example. Sketch off all the stations on tracing paper and do the same with each one as I have just done with number 6 and tabulate them as in table I.

TABLE I.

STATION	SQ. FT. ½ AREAS
2	.09
3	.41
4	1.47
5	2.60
6	3.74
7	4.81
8	5.36
9	5.05
10	4.04
11	2.76
12	1.12
13	.16
14	....

Stations 2, 3 and 14 are easily obtained without applying the rule. With the other stations one should take as many divisions as he thinks is needed—never less than four. The ordinates are measured off with a decimal scale to the scale of the drawing in feet and tenths of feet. In this case a tenth scale is used, but in some cases where the scale is ½" = 1' or ¼" = 1', a 20th or 40th scale should be used. If these scales are not at hand the ordinates can be measured with a tenth scale as if the drawing were to that scale. The final result should then be multiplied by 4 if the scale is ½" or 16 if the scale is ¼" and so on. One might at first thought multiply by 2 for ½" scale and 4 for ¼" scale, but this is wrong. We must remember that an area is length times breadth, or a square. That is, if our scale is ½" = 1 foot and we measure the distances with a scale 1" = 1foot when we multiply the 2 dimensions together, our result is

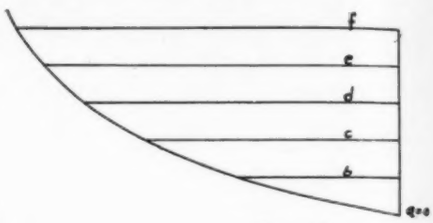


Fig. 18.

Where the curve is sharp and the area small the station should be spaced close together.

the reader follows the discussion carefully he may be able to choose for himself, which is the better. In the design (parts I and II) the stations were spaced from bow to stern with no regard to the water line divisions.

To find the displacement we want to determine the volume of the underbody between the two ends of the l.w.l. We see at once that our water line is not divided up into equal parts and our rule cannot be applied as the stations stand at present. However, this need not bother us in the least for we are going to draw a displacement curve or curve of sectional areas first.

Now the curve of sectional areas, figure 19, is a curve laid out on the l.w.l. length as a base (in this case to ½" scale) and at each station the area of that station is laid off to some convenient scale as ½" = 1 sq. ft. and a curve drawn through these points as shown in Fig. 19. This curve represents the longitudinal distribution of displacement; its area in sq. ft. (to scale) equals the displacement and its horizontal center the c.b. of the boat.

By this example we see the rules for areas can be applied also for volume. The curve should be sweet and fair and free from all bumps and hard turns. If the boat has not been faired up carefully the curve of sectional areas will not pass through all the points, and if one experiences this trouble he had better make sure his design is fair. The quality of the design, the speed and the performance of the boat are all determined by the shape and character of the curve of areas. In many boats, especially high speed boats, the curve of areas is drawn first and the areas of the sections made to agree with the areas shown by the various ordinates. Next month I shall have considerable to say about the shape and appearance of this curve, which, in a way, is the key to the whole science of designing.

Table I gives the areas of the various stations (Fig. 1) from which the curve was laid out. In Fig. 19 a line was laid off to ½" scale, the length of the l.w.l., and at the proper stations the areas given by Table I were plotted (½" = 1 sq. ft.) and the curve drawn through them. The original stations are shown as full lines. To apply our rule and find the area the base was redivided into ten new stations (shown dotted) with one station at each end. These new ordinates were measured and the results put down in Column I, Example II. Rule (2) was applied in this case, the end ordinate being zero. I have added 0.1 of stations 1 and 9 at the end, thus giving 1.1 of each of these stations as the rule calls for. The sum 30.29 is multiplied by 3.12, the dis-

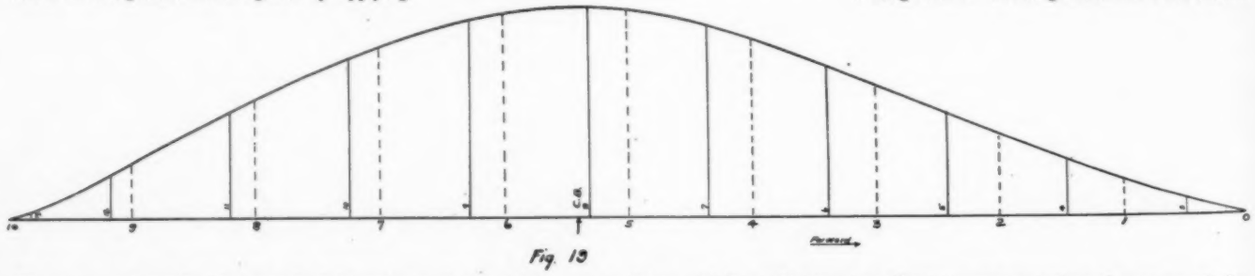


Fig. 19

The curve of sectional areas is laid out on the L. W. L. as a base and its ordinates are distances representing the areas of the corresponding sections. This curve shows at a glance the longitudinal distribution of the boat's displacement.

4 times too small. It is best, however, to measure everything to the scale to which it is drawn and avoid confusion.

In a previous article I spoke of the manner of dividing up the design into stations and mentioned the fact that some designers place a station at each end of the load water line and divide the distance between into equal parts (generally 10). Of course, this gives stations spaced at odd feet and inches, but if

tance between ordinates, and by 2 for two sides of the boat, as only ½ areas were plotted. Column II gives the levers or arms about the forward end of l.w.l Column III gives the moments (ordinates times arms). By right these arms should each be multiplied by s (= 3.12), but this was saved till the end, thus simplifying the work. The sum of Column III multiplied by s is divided by the sum of the ordinates and the result gives the distance from the front end (ordinate 0) to the center of the curve, or the C. B. of the boat.

EXAMPLE II (FIG. 19).

ORDINATE	½ AREA SQ. FEET	LEVER ABOUT 0	MOMENTS ABOUT 0
0	0	0	0
1	.96	1	.96
2	2.10	2	4.20
3	3.38	3	10.14
4	4.50	4	18.00
5	5.25	5	26.25
6	5.16	6	30.96
7	4.30	7	30.10
8	3.00	8	24.00
9	1.40	9	12.60
10	0	10	0
	.24		1.35
	30.29		158.56

s = 3.12.

30.29 × 2 × 3.12 = 189.0 cu. ft.

189.0 × 64 = 12.096 pounds disp.

$$\text{C.B.} = \frac{158.56 \times 3.12}{30.29} = 16.33 \text{ ft. from 0.}$$

It will be noticed the rule is applied to Column III for moments the same as to areas Column I.

The keel was not included in the areas given by Table I, so the value, 12,096 pounds, is the displacement exclusive of the keel. The areas of the keel at the several stations were measured off (new spacing of stations) and the rules applied as in Example II. The displacement of the keel was found to be 467 pounds and its C.B. at 26.1′ from the forward end of the L.W.L.

Table II gives the displacement of the hull proper and the keel, and shows how they were combined to obtain the new C.B. The combined displacement was found to be 12,563 pounds, and the combined C.B. as 16.70 ft. aft. It will be noticed that the center of buoyancy moves aft about 6 inches, due to the buoyant effect of the keel.

TABLE II.

	Displacement.	C.B.	Moments.
Hull	12,096	16.33	197,527
Keel	467	26.1	12,188
Total	12,563	16.70	209,527

WEIGHTS AND TRIM.

Let us now turn our attention to the consideration of weights and trim from the construction plan. For instance, the weights of the planking, frames, floors, deck, inside joiner work, etc., were figured and a rough estimate made of the smaller items which makes the figure given very accurate. This figure is rather large for a boat of this type, but for a reason that will be seen later the construction was made very heavy.

The other figures given are taken in some cases from returned weights of other boats and from computations and known weights of equipment.

For the purpose of illustrating design work in all its phases the type design given was made a ballasted boat, that is, it was given more draught and displacement than ordinarily belongs to a boat of this type. A great many boats to-day adopt this practice in a good many cases to obtain headroom in a small boat. While in a good many cases I would not recommend this practice I have chosen to ballast this boat to cover the whole field. For the present we will consider the boat with no ballast, that is, with a displacement of 10,653 pounds instead of 12,563 pounds.

As I mentioned in an earlier article it is not customary to figure the weights of a motor boat for displacement work, as the designer generally knows the water line close enough from previous experience. However, as we must know the larger weights and their location for the purpose of trim I have carried through the the whole weight calculation and given the summary in Table III. It is very instructive to study these weights and, of course, this method is always used by designers on new types about which they have no data and by anyone who has had little or no experience. After the principal dimensions and displacements are determined some sort of an estimate of weights should be made before starting on the lines to see if the design is possible. With the common types of motor boats, however, one is almost sure to be safe if he keeps within reasonable limits. At any rate, some of the weights must be determined for the purpose of trim, as I am about to show. In Table III these various weights going into the boat are given. The hull weight (5,150) was obtained from data I had at hand on other boats and also by a calculation made.

Now, in order to make a boat trim on an even keel we must have the combined center of all the weights over the center of buoyancy (C.B.) In the design under consideration the C.B. was found 16.7 feet aft of the forward end of the l.w.l. If the combined center of the weights (C.G.) does not come over the C.B. the boat will assume a new water line differing at some angle from the designed one. The boat will be either down by the head or stern, depending on which side of the C.B. the C.G. falls. Let us turn our attention to Fig. 20; here we have a system of weights. I have taken moments of the weights (Aa, Bb, etc.) about O and found the center of gravity of the system to be at "C.G." If we were to consider this a plank with one large weight (equal A + B + C + D) at "C.G." we see that if we were to support this by a single force it would have to be directly under "C.G." This is what happens in a boat in which the downward force of weights is supported by the upward force of buoyancy, and the centers of the two systems must be in line. In the same way we must find the center of the weights making up the boat and so shift the weights that their combined center C.G. falls over the C.B.

A preliminary layout was made and the various weights located with reference to construction and accommodation. Column II, Table III, gives the distance of the weights from the forward end of the l.w.l. The C.G. of the hull proper was not figured but was taken at the center of buoyancy, which has been found to be very nearly correct, and can almost always be assumed to be there. Column III gives the moments of the weights (Col. I × Col. II). The sum of the moments (159,493 ft.-lbs.) was divided by the sum of the weights (10,653 lbs.) This gave the C.G. at 15.0 aft or 1.7 ft. forward of the C.B. This gives a moment of trim of 10,653 × 1.7 = 18,412 ft.-lbs. I fear this means little to the reader. To understand this I will leave the subject under consideration for a while and call your attention to a new point.

The professional designer figures from the lines "the moment to trim one inch"; that is the number of ft.-lbs. that would throw the boat out of trim one inch. If we knew that the moment to trim 1″ was, say, 1,000 ft.-lbs. we would know the boat under consideration was some 18″ out of trim. It is really quite important to know this that one may know what effect the shifting of weights has upon trim.

The method of obtaining this moment to trim 1″ is a rather long and difficult task entirely out of keeping with these articles. However, I will give a very simple formula that the reader may readily compute this value from the lines:

$$\text{Mom. to Trim 1}'' = \frac{16 \times L^2 \times B \times I}{3} = \text{ft.-lbs.}$$

Where L is the l.w.l length and B the l.w.l. beam the only unknown is I. This is a value depending upon the area of the water line. The area of the l.w.l. plane can be easily found by applying Rule 2. The next step is to divide this area by L × B and look up the value of I corresponding in Table V and substitute it in the formula. For an illustration take the case in hand:

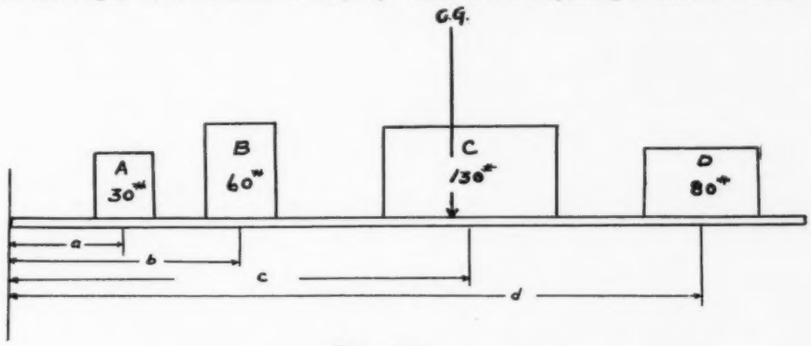


Fig. 20

The position of the center of gravity, C. G., of several masses is found by adding their moments (weight x lever arm) about a certain point of reference and dividing by the sum of the weights.

L = 31.17′

B = 8.17′

Area of W.L. = 174.7 square feet.

174 ÷ (L × B) = .68

I from Table V = .039

$$\text{Mom. to Trim 1}'' = \frac{16 \times 31.2^2 \times 3.2 + .039}{3}$$

= 1,661 ft.-lbs.

Now we saw our boat was out of trim 18,412 ft-lbs., which means it is out of trim 18,412 ÷ 1,661 = 11 inches. This would be 5½″ down by the head if the trim were divided equally at the bow and stern, which is generally very nearly the case.

We see at once that this is too much trim and the weight must be re-arranged. This was done (see Table IV) by moving some of the weights aft. The fuel was put aft in the cockpit, and the engine moved aft 5″, and so on. The new figures show the boat 7,518 ft.-lbs. out of trim, which would mean a trim of 4½″ or about 2¼″ down by the bow. The weights should be re-arranged again, if this trim is thought excessive, until the C.G. comes at 16.7 feet.

In a ballasted boat one would not have to spend so much time trimming his boat as the ballast could be placed to give the right trim. This is illustrated at the end of Table IV, 1,910 lbs. of ballast is needed to bring the boat down to 12,563 lbs., or the displacement corresponding to the designed l.w.l. Placing this ballast at 20.6 ft. gives the necessary moment so that the final C.G. falls at 16.7 feet. It is well in all boats to plan for a little ballast to make the final trim correct after launching.

TABLE III.

	1	2	3
Hull woodwork complete	5,150	16.7	86,005
Engine	1,600	18.1	28,960
Reverse gear	283	20.0	5,660
Shafting, propeller etc.	125	25.5	3,187
Fuel and fuel tanks	450	4.0	1,800
Steering gear and rudder	157	27.5	4,317
Anchors (2)	150	1.8	270
Anchor gear	365	1.0	365
Ropes, lines, etc.	143	3.0	429
Deck fittings, ports, etc.	217	13.5	2,929
Stove and galley outfit	243	12.5	3,037
Ice box	75	12.5	937
Berths	350	7.2	2,520
Chairs, cushions, etc.	227	18.0	4,086
Water tank and piping	315	0.5	157
Wash bowl and closet	108	6.0	648
Paint	95	16.7	1,586
People and effects	600	21.0	12,600
Totals	10,653	15.0	159.493

TABLE IV.

	1	2	3
Hull woodwork complete	5,150	16.7	86,005
Engine	1,600	18.5	29,600
Reverse gear	283	20.4	5,773
Shafting, propeller, etc.	125	25.5	3,187
Fuel and fuel tanks	450	25.5	11,475
Steering gear and rudder	157	27.5	4,317
Anchors (2)	150	1.8	270
Anchor gear	365	1.0	365
Ropes, lines, etc.	143	3.0	429
Deck fittings and ports	217	13.5	2,929
Stove and galley outfit	243	13.0	3,159
Ice box	75	13.0	965
Berths	350	7.2	2,520
Chairs, cushions, etc.	227	18.0	4,086
Water tank and piping	315	1.5	473
Wash bowl and closet	108	6.0	648
Paint	95	16.7	1,586
People and effects	600	21.0	12,600
Summary without ballast	10,653	16.0	170,387
Ballast	1,910	20.6	39.414
Summary with ballast	12,563	16.7	209,801

TABLE V.

Area of W.L. L × B	"I."
.50	.023
.54	.026
.58	.029
.62	.033
.66	.037
.68	.039
.70	.042
.74	.047
.78	.052
.82	.058
.84	.061
.88	.066
.90	.069

Next month we shall take up some consideration of forms, shapes of curves of areas and waterline together with a brief consideration of stability and speed. We shall also study the design just completed in a critical manner and see many ways of improving upon it.

MEASURING.

Supplementary Diagrams and Valuable Tables Completing the Article on Measuring, Which Appeared in the March Issue.

By C. F. Chapman.

AREA OF MIDSHIP SECTION.

THE method of determining the area of the midship section is an approximation which is very close to the true value in the average boat, but a point on which considerable juggling is possible by one trying to "beat the rule." In Fig. 3 the shaded section shows the area that the rule determines and the unshaded portion shows that part of the true section that is neglected. It will be noticed, however, that about as much of the shaded section extends beyond the line of the planking as there is unshaded within, consequently one about offsets the other. The reason for employing this method of arriving at the area of the midship section is simply because it would be next to impossible to obtain the true area easily. A form of midship section approaching a triangle is penalized by this method while one approaching a trapezoid is benefited. The area of any form of midship section between these two extremes approaches the area as determined by the rule. The waterline beam (*B W L*) is divided into five equal parts, and at the first inboard section (*A*) a perpendicular (*H*) is dropped to the outside of the planking. The length of *H* in feet or fraction thereof is the draft, and this value multiplied by *B W L* in feet gives the area of the midship section (square feet).

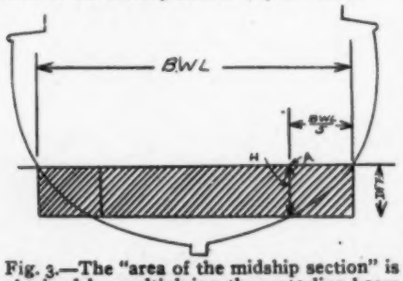


Fig. 3.—The "area of the midship section" is obtained by multiplying the waterline beam by the draft at a point one-fifth the distance from the side of the hull. The shaded area shows that for the average boat the approximation is a close one.

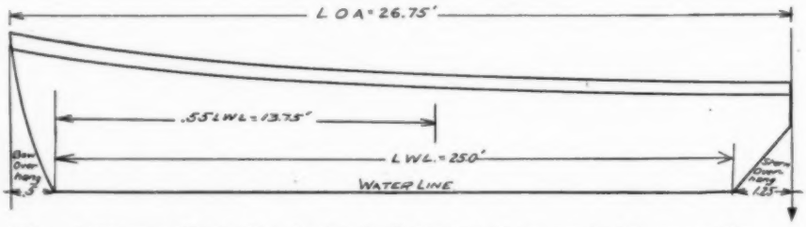


Fig. 1.—Diagram illustrating the longitudinal dimensions required in measuring under the A. P. B. A. rules.

THE MEASUREMENTS.

THE first measurement to be taken is the overall length, which, as the name indicates, is the distance between the foremost and the aftermost part of the hull taken in a straight line.

Next obtain the overhang at the bow and the stern, drop the plumb lines down into the water from the points to which the overall length was measured. By means of the foot rule obtain the distance along the surface of the water from the plumb line to the point where the hull proper intersects the water plane. The rudder or stock should not be considered part of the hull proper. The sum of these overhangs at the bow and the stern subtracted from the first measurement, the overall length, will give the load waterline length. See Fig. 1.

The next step is to determine at what point the overall beam is to be taken. The rule says that it shall be taken at the point of greatest midship section, if this be known; if not, at a point 55% of the l.w.l. aft of the bow. The 55% point should be located by multiplying the l.w.l. previously taken by .55. To this product the overhang of the bow is added and a distance equal to this sum should be measured aft from the extreme bow in a straight line and the point plainly marked on the deck or other suitable part of the boat.

To get the overall beam, which is the next step and must be ascertained in order to get the waterline beam and finally the area of the midship section, the plumb line should be hung from the athwart ship straight-edge down into the water so that they just touch the outermost portion of the boat, which is generally he half-round or rubbing strake. Measuring between the two plumb lines with a steel tape will give the overall beam.

Next get the overhang at each side by measuring the distance between the outside of the planking and the plumb lines which are still in the same position as when taking the beam measurement. Subtracting the sum of the overhangs on the two sides from the overall beam will give the waterline beam.

The next measurement is the "draft." Divide the waterline beam measurement by five and this quotient locates the point that the draft is to be taken at. To this amount add the overhang on one side which will represent the distance inboard from the extreme outside of the boat, or, in other words, the distance from the plumb lines from which the overhang was measured.

Referring to Fig. 2 will make this clear:

B O A = the beam overall
a a' = total overhang
B W L = beam on the waterline
b = ⅕ of the *B W L*
c = ⅕ *B W L* + overhang = *b* + *a*
d = the draft

To obtain the "draft" at the above-mentioned point the two short wooden straight-edges, *e* and *f*, are clamped together at right angles so that the end of *e* is at a distance from *f* equal to ⅕ *B W L* + the overhang on one side or at a distance equal to *c*. Lower *e f* down into

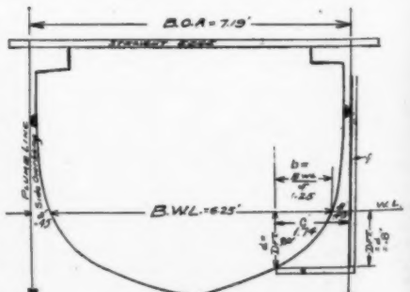


Fig. 2.—Diagram illustrating the method of obtaining the measurements required to determine the area of the midship section.

the water until the inner end of *e* is just in contact with the boat's planking and the inner edge of *f* is in line with the plumb line *g*. The point where the water intersects stick *f* should be marked with a pencil and then *e f* removed from the water and the distance from the mark along *f* to its junction with *e* should be measured and will be the amount of draft. If the stick *f*, from *e* up, has been previously calibrated the draft may be read off directly.

Multiplying the draft measurement expressed in feet and fractions thereof by the waterline beam expressed will give the area of the midship section in square feet and is the last measurement to be taken on the hull.

Tables Worked Out by Mr. Chapman for MoToR BoatinG, by Which the Horse Power of any Engine Under the A. P. B. A. Rule May be Read Directly From the Bore and Stroke.

TABLE I.

Horse Power per Cylinder, 2 Cycle Engines.

A. P. B. A. Rules.

H. P. = .7843 × A × S (when S is less than 6″) H. P. = .4040 × A (when S = 6″ or more)

Stroke.	BORE																							
	3	3⅛	3¼	3⅜	3½	3⅝	3¾	3⅞	4	4⅛	4¼	4⅜	4½	4⅝	4¾	4⅞	5	5⅛	5¼	5⅜	5½	5⅝	5¾	5⅞	6	6½
3	1.39	1.50	1.63	1.75	1.88	2.02	2.16	2.31	2.46	2.62	2.78	2.95	3.12	3.29	3.47	3.66	3.85	4.04	4.24	4.45	4.66	4.87	5.09	5.31	5.54	6.51
3⅛....	1.44	1.57	1.69	1.82	1.96	2.11	2.26	2.40	2.56	2.73	2.90	3.08	3.25	3.42	3.62	3.81	4.01	4.21	4.42	4.64	4.85	5.07	5.30	5.54	5.77	6.78
3¼....	1.50	1.63	1.76	1.90	2.04	2.19	2.34	2.50	2.67	2.84	3.01	3.20	3.38	3.56	3.76	3.96	4.17	4.38	4.59	4.83	5.05	5.27	5.51	5.75	6.00	7.05
3⅜....	1.56	1.69	1.83	1.97	2.12	2.28	2.43	2.60	2.77	2.95	3.13	3.32	3.51	3.70	3.91	4.12	4.33	4.55	4.77	5.01	5.24	5.47	5.73	5.98	6.23	7.32
3½....	1.61	1.76	1.90	2.04	2.20	2.37	2.53	2.70	2.87	3.06	3.24	3.44	3.64	3.84	4.05	4.27	4.49	4.72	4.95	5.20	5.44	5.68	5.94	6.20	6.46	7.59
3⅝....	1.67	1.82	1.96	2.12	2.28	2.45	2.62	2.80	2.97	3.17	3.36	3.56	3.77	3.96	4.20	4.42	4.65	4.88	5.13	5.38	5.62	5.78	6.15	6.42	6.69	7.86
3¾....	1.73	1.88	2.03	2.19	2.36	2.53	2.71	2.89	3.08	3.28	3.47	3.70	3.90	4.12	4.34	4.57	4.81	5.05	5.30	5.57	5.82	6.08	6.36	6.64	6.92	8.14
3⅞....	1.79	1.93	2.10	2.26	2.44	2.62	2.80	2.99	3.18	3.38	3.59	3.81	4.03	4.26	4.48	4.73	4.97	5.22	5.48	5.75	6.02	6.29	6.58	6.86	7.16	8.41
4	1.85	2.00	2.17	2.34	2.52	2.70	2.89	3.08	3.28	3.49	3.71	3.93	4.16	4.39	4.63	4.88	5.13	5.39	5.66	5.93	6.21	6.49	6.79	7.08	7.39	8.67
4⅛....	1.91	2.06	2.24	2.41	2.59	2.78	2.98	3.18	3.38	3.60	3.82	4.05	4.29	4.53	4.77	5.04	5.30	5.56	5.84	6.12	6.40	6.69	7.00	7.30	7.62	8.95
4¼....	1.96	2.13	2.30	2.48	2.67	2.87	3.07	3.28	3.49	3.71	3.94	4.17	4.42	4.67	4.92	5.19	5.45	5.73	6.01	6.30	6.60	6.89	7.21	7.52	7.85	9.22
4⅜....	2.02	2.19	2.37	2.55	2.75	2.95	3.16	3.37	3.59	3.82	4.05	4.29	4.55	4.80	5.06	5.34	5.62	5.89	6.19	6.48	6.80	7.10	7.43	7.74	8.09	9.49
4½....	2.08	2.26	2.44	2.63	2.83	3.04	3.25	3.47	3.69	3.93	4.17	4.42	4.68	4.94	5.21	5.49	5.77	6.06	6.36	6.67	6.99	7.30	7.64	7.97	8.32	9.76
4⅝....	2.14	2.32	2.51	2.70	2.91	3.12	3.34	3.56	3.80	4.04	4.28	4.54	4.80	5.07	5.35	5.64	5.94	6.23	6.55	6.86	7.19	7.51	7.85	8.19	8.55	10.03
4¾....	2.19	2.38	2.57	2.77	2.99	3.20	3.42	3.66	3.90	4.15	4.40	4.66	4.94	5.22	5.50	5.80	6.09	6.40	6.72	7.04	7.38	7.71	8.06	8.41	8.77	10.30
4⅞....	2.25	2.44	2.64	2.84	3.06	3.29	3.52	3.76	4.00	4.26	4.51	4.79	5.06	5.35	5.64	5.95	6.25	6.57	6.90	7.22	7.57	7.81	8.27	8.63	9.00	10.58
5	2.31	2.51	2.71	2.92	3.14	3.37	3.61	3.85	4.11	4.37	4.63	4.91	5.20	5.49	5.79	6.10	6.41	6.76	7.07	7.41	7.76	8.12	8.48	8.85	9.24	10.84
5⅛....	2.36	2.57	2.78	2.99	3.22	3.46	3.70	3.94	4.21	4.48	4.75	5.03	5.32	5.63	5.92	6.26	6.57	6.90	7.25	7.59	7.95	8.32	8.70	9.07	9.47	11.11
5¼....	2.42	2.63	2.85	3.06	3.30	3.54	3.79	4.04	4.31	4.59	4.87	5.15	5.46	5.77	6.08	6.41	6.74	7.07	7.42	7.78	8.15	8.52	8.91	9.29	9.70	11.38
5⅜....	2.48	2.69	2.91	3.13	3.38	3.62	3.88	4.14	4.41	4.70	4.98	5.27	5.58	5.90	6.21	6.56	6.90	7.24	7.60	7.96	8.35	8.72	9.12	9.51	9.93	11.65
5½....	2.54	2.76	2.98	3.21	3.46	3.71	3.97	4.23	4.52	4.81	5.10	5.40	5.72	6.04	6.37	6.71	7.05	7.41	7.78	8.15	8.55	8.92	9.33	9.73	10.16	11.92
5⅝....	2.60	2.82	3.05	3.28	3.54	3.79	4.06	4.33	4.62	4.92	5.21	5.52	5.84	6.18	6.50	6.86	7.22	7.58	7.95	8.33	8.74	9.12	9.55	9.95	10.39	12.20
5¾....	2.66	2.88	3.12	3.35	3.61	3.87	4.15	4.42	4.72	5.02	5.33	5.64	5.98	6.32	6.66	7.02	7.38	7.74	8.13	8.51	8.93	9.32	9.75	10.17	10.62	12.48
5⅞....	2.71	2.94	3.18	3.42	3.69	3.96	4.24	4.52	4.82	5.13	5.45	5.77	6.10	6.46	6.80	7.18	7.54	7.90	8.31	8.70	9.12	9.52	9.80	10.39	10.85	12.75
6″ and over....	2.86	3.10	3.35	3.62	3.89	4.17	4.46	4.76	5.08	5.40	5.73	6.07	6.43	6.80	7.16	7.54	7.93	8.35	8.75	9.17	9.60	10.05	10.49	10.95	11.42	13.41

To obtain total horse-power of engine multiply values given in above table by total number of cylinders.
To obtain horse-power of 4 cycle engines multiply horse-power of 2-cycle engine by
.85 when stroke is less than 6″
.825 when stroke is 6″ or greater.
To obtain horse-power of engines for "Racing Boat" class multiply Table I values by 1.5.

TABLE II.

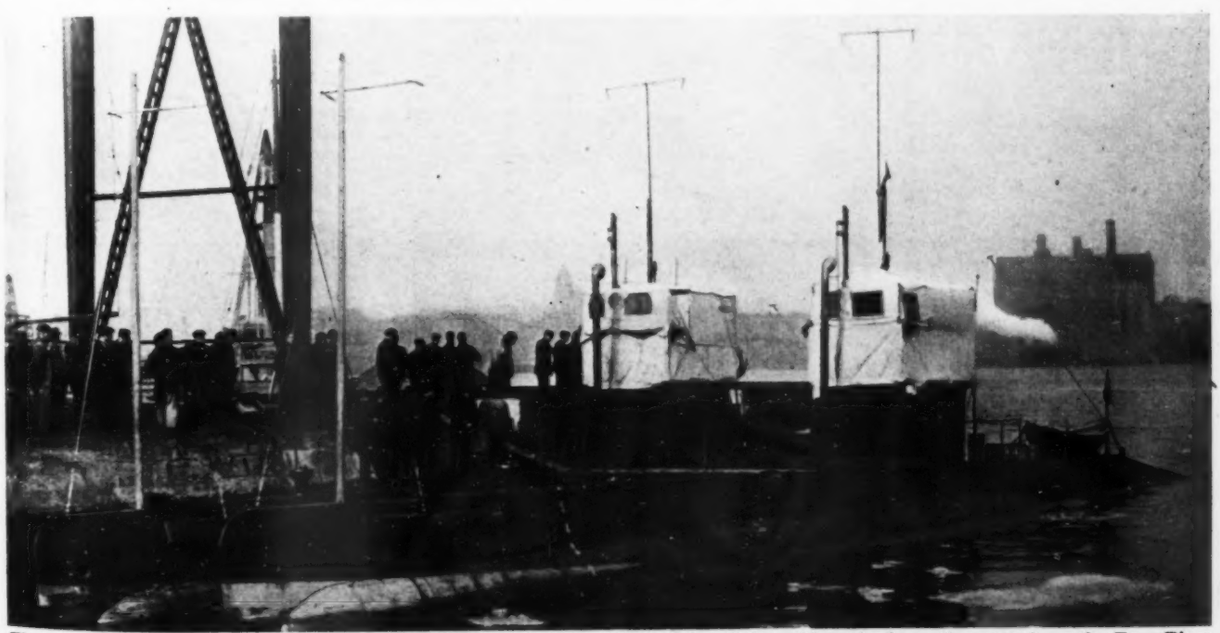
Horse Power per Cylinder, 4 Cycle Engines.

A. P. B. A. Rules.

H. P. = .667 × A × S (when S is less than 6″) H. P. = .333 × A (when S = 6″ or more)

Stroke.	BORE—Inches															
	4	4¼	4½	4¾	5	5¼	5½	5¾	6	6½	7	7½	8	8½	9	10
3¾.....	2.61	2.95	3.32	3.70	4.08	4.49	4.95	5.41	5.90	6.89	8.01	9.24	10.49	11.82	13.22	16.36
4.....	2.79	3.15	3.54	3.94	4.36	4.80	5.28	5.77	6.29	7.37	8.55	9.82	11.17	12.60	14.11	17.45
4⅛.....	2.96	3.35	3.76	4.18	4.64	5.11	5.61	6.13	6.68	7.85	9.09	10.40	11.85	13.38	15.00	18.54
4½.....	3.14	3.55	3.98	4.43	4.90	5.41	5.94	6.49	7.07	8.30	9.62	11.03	12.55	14.18	15.89	19.63
4¾.....	3.32	3.74	4.20	4.67	5.18	5.71	6.26	6.85	7.46	8.77	10.14	11.66	13.25	14.95	16.78	20.73
5	3.50	3.94	4.42	4.92	5.45	6.01	6.60	7.21	7.86	9.23	10.70	12.28	13.95	15.73	17.65	21.82
5¼.....	3.67	4.14	4.64	5.17	5.72	6.31	6.93	7.57	8.25	9.68	11.21	12.88	14.64	16.53	18.53	22.91
5½.....	3.85	4.33	4.86	5.41	6.01	6.61	7.26	7.93	8.65	10.15	11.75	13.50	15.35	17.32	19.42	24.00
5¾.....	4.02	4.53	5.08	5.66	6.27	6.91	7.59	8.29	9.04	10.60	12.28	14.10	16.04	18.10	20.30	25.09
6″ and over.....	4.19	4.73	5.31	5.91	6.55	7.22	7.92	8.66	9.42	11.06	12.83	14.73	16.76	18.92	21.21	26.18

To obtain total horse-power of engine multiply values given in above table by total number of cylinders.
To obtain horse-power of 2 cycle engines multiply horse-power of 4 cycle engines by
1.176 when stroke is less than 6″
1.212 when stroke is 6″ or greater.
To obtain horse-power of "Racing Boat" class multiply Table II values by 1.5.



The two Diesel-driven submarines, E1 and E2, photographed at New York during their maiden trip down the coast from the Fore River Ship Building Co. These are the first of our submarines to be equipped for wireless telegraphy.

The Era of the Stock Motor Boat.

The Tendency Toward the Production of Stock Boats of a Class Hitherto Built Only to Order and How It Will Affect the Trade.

By Harold Whiting Slauson.

It is probably unnecessary to explain that the stock motor boat is by no means a new product. A number of prominent concerns, especially in the Central West, Mullins, the two Racines, the Truscott Company and others, have been turning out motor boats in large numbers for several years. But recently there has been a tendency toward the stock idea among the builders of more pretentious craft, the kind hitherto built only to order, and it is this significant trend that Mr. Slauson has considered.—Editor.

A VISITOR to any of the recent motor boat shows will most assuredly have been impressed with the number of large and luxurious runabouts and cruisers that were on exhibition. He may have stepped aboard one of them and inquired, in an envious tone, "For whom was this built?" In this event, it is probable that his question was met with the reply, "For *you*—if you want it." "But it is marked 'Sold.'" "Yes, this particular boat has just been purchased by Commodore ———, but we have nine others exactly like it, ready for immediate shipment"—and while the astonished inquirer was not able, literally, to "wrap the boat up and take it home," the salesman's reply represents the situation of several of the prominent boat builders who are making stock models of complete craft in large sizes.

In fact, the stock motor boat has practically reached the stage that has already been attained for some years by the automobile. That the automobile and motor boat industries should run apace is highly natural, as the experiments and improvements of the one, especially insofar as the engine is concerned, are of the utmost value to the other. The familiar interest which the public always has displayed in things kindred to the motor car naturally finds reflection in its attitude toward the motor boat, and it is reasonable to presume that one who takes pleasure in automobiling will also delight in motor boating.

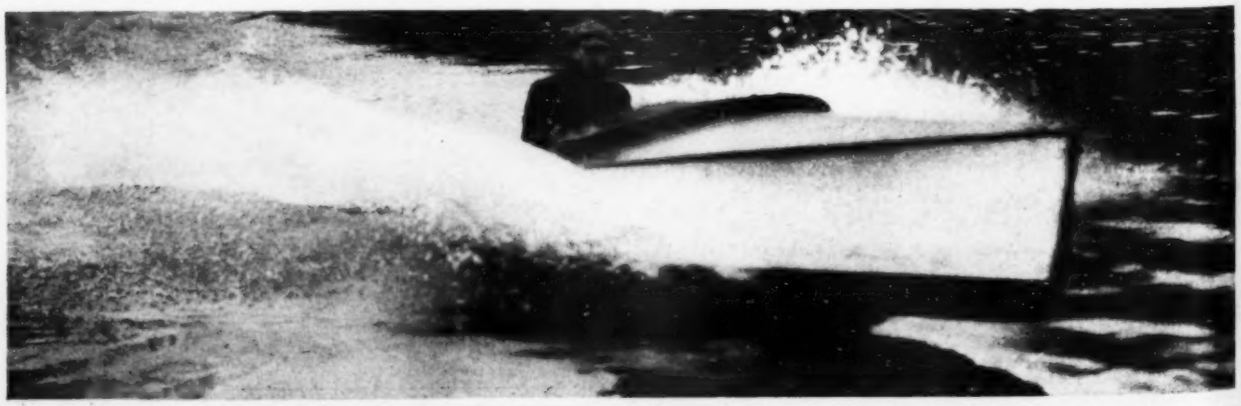
Cruisers like this are now kept in stock by the Electric Launch Company.

When considering vehicles which drive one over the land or through the water, it is natural to suppose that both would be viewed from the same angle, and that the methods of exploitation would follow each other in close relationship. If the public can be persuaded to enter an automobile salesroom, determine which of several types it desires, pay its money and take the car home, the process should be similar when it buys a motor boat. It expects and demands that the automobile be of a type thoroughly tried out and improved to the highest possible point of efficiency by competent experts; why should not the same hold true in the case of the average motor boat?

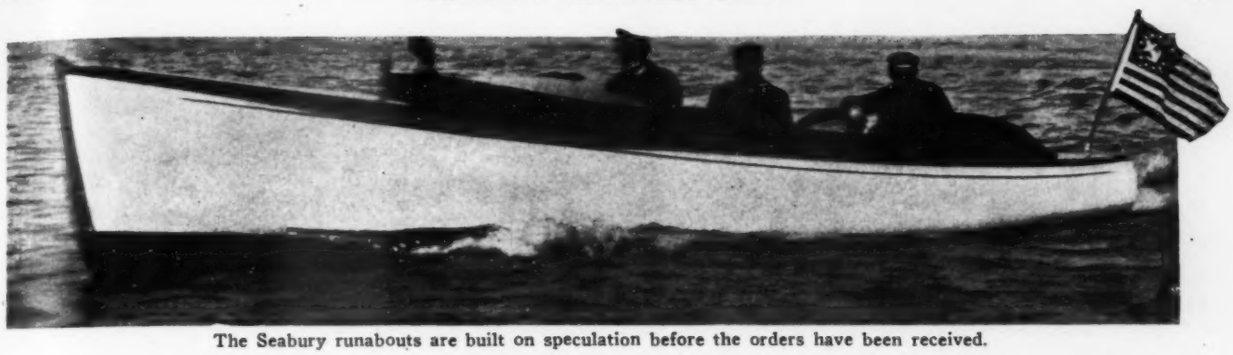
To follow further the parallelism of the two lines of industry, it is evident that the economic advantages of quantity production that have lowered the prices of all manufactured articles from watches to automobiles hold good also in the case of the motor boat, and consequently the latter can be made at much less cost in lots of ten or a dozen than could be done if each hull and motor was of a special design. The builders of the stock motor boats either manufacture their own motors, or purchase them in such quantities that they are able to make a much more attractive price for the complete craft than would be the case were the hull built to order at one shop and the engine secured separately. This is an arrangement that may not appeal to some buyers who may be prejudiced in favor of a certain make of engine, but it is only in this manner that the stock boat manufacturer is enabled to furnish any speed or power plant guarantees with the complete craft.

With a motor boat, however, a great number of variations of hull design, motor power and location, and cabin and cockpit arrangement are made possible. Then, too, the purchaser of a large motor boat may have previously owned one or more of a smaller size, and is therefore in a position to know—or to think he knows—exactly what he wants. With sublime confidence will he express opinions on relative dimensions, details of design and construction, type and power of the engine desirable, and with juvenile contentment may place himself entirely in the hands of anybody willing to carry out these ideas. A prominent builder has stated that, in consequence of this tendency, seventy-five per cent. of those purchasing their first *large* motor boat suffer disappointment. Either the boat they receive is inferior and does not fulfill their expectations, is late in delivery, or the engine does not operate satisfactorily; and yet are they forced to accept the boat and to make the best of their bad bargain, for payments have been made, and these, of course, must be protected. But many a motor boat owner seems bound to learn this lesson through hard experience.

The builder of the stock model consequently finds several preferences that must be overcome, and he must be able to convince the prospective customer that some of the details of construction on which the latter had set his mind and heart are not as advisable as would at first appear. This all points to the fact that the successful stock motor boat must be of the very best design possible and that it must be a model that has been "tried out" thoroughly in order to be sold in competition with a craft that, when built to order, will embody all of the purchaser's pet ideas and theories. The builder of such a boat must first determine what the public demands and then adopt the best possible designs to satisfy these requirements in a practical manner. Thus it is the builder who conducts the experimenting



The Reliance 21-foot runabout doing 20 miles an hour with 20 H. P. This boat has been so successful that it is now built as a stock model.

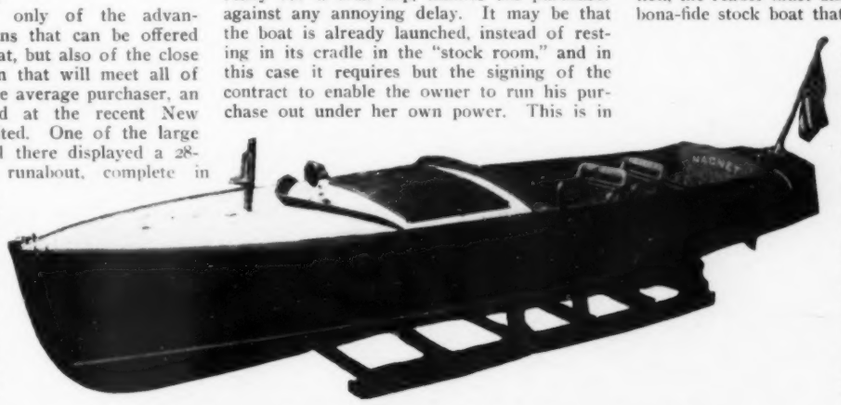


The Seabury runabouts are built on speculation before the orders have been received.

and gives his experience to the purchaser, who is assured of a craft that is thoroughly tested in every particular. Its capabilities of performance are known, and the Doubting Thomases may be assured with their own eyes exactly what the craft is and what it will do. There is no guessing as to speed, seaworthiness, or stability, and because such a stock boat is of the design with which the manufacturer has had much experience, he is able to give a positive guarantee to cover all of these important points.

As illustrative not only of the advantageous price quotations that can be offered on the stock motor boat, but also of the close approach to the design that will meet all of the requirements of the average purchaser, an incident that occurred at the recent New York show may be cited. One of the large builders that exhibited there displayed a 28-foot, stock model runabout, complete in every detail and guaranteed to attain a certain speed. An experienced motor boat owner had contemplated for some time an addition to his fleet in the form of a 30-foot runabout. He went to the company in question—who were also designers and builders, as well as manufacturers of motor boats—with the intention of ordering plans of the 30-foot runabout to meet his requirements. He found, however, that the construction of this craft especially to his order would cost practically 50 per cent. more than the price charged for the stock model that was similar in many respects, but was two feet shorter. Furthermore, the question of the speed of the special, and more expensive, boat was more or less problematical, whereas the stock model was guaranteed and could be tested before the purchase was effected. It is scarcely necessary to state that the sales manager found but small difficulty in convincing the customer of the advisability of contenting himself with the smaller, less expensive, and thoroughly tried-out craft. The stock models were manufactured in lots of ten from the same plans and forms: the keels and planking could be cut to uniform size for each, and the entire construction illustrated the advantages of quantity production that accrued to the benefit of the purchaser, both as regards reliability and price.

But low price and high efficiency guarantee are not the only benefits obtained by the purchaser of a well-constructed stock motor boat. The fact that the boat is entirely completed, fully equipped, and at the most requires but the gasoline in the tank and, possibly, the water under her keel to make her ready for a trial trip, insures the purchaser against any annoying delay. It may be that the boat is already launched, instead of resting in its cradle in the "stock room," and in this case it requires but the signing of the contract to enable the owner to run his purchase out under her own power. This is in striking contrast to the months that must elapse between the ordering of the plans for a special boat and the completion of the craft, and the weeks of doubt as to how she will eventually "turn out" as regards speed and seaworthiness. It is the man who has once been disappointed in this manner who will become the most enthusiastic convert to the stock model idea.



A Lawley runabout that has proved a popular stock model.

On the day before last Decoration Day, such a man walked into the office of one of the large boat building plants to look over their stock. Three months previously he had contracted with a small concern to build for him a fast runabout which he was especially anxious to have ready for use on Decoration Day. This boat was not ready, and even had it been, he stated he would not have accepted the craft, so far was it from what he had been led to expect it would be. A *stock* 28-foot Express Launch, having a guaranteed speed of 20 miles an hour, was shown him. This he purchased, taking it away that very afternoon, and he thus was able to use his boat on Decoration Day, as he had at first planned. He ran it all summer, and never once was it necessary during that time to communicate with the factory.

The medium- and large-size stock motor boat is well exemplified by several of the leading designers and builders. In this connection, the reader must differentiate between the bona-fide stock boat that is built in quantities "on speculation" because the manufacturers have confidence in its ability to suit the requirements of the average purchaser; and the craft that is constructed from stock plans and specifications *after* a definite order has been received. Even though not an especially-designed model, the latter craft is in no sense a *stock* boat.

Probably one of the best examples of the bona-fide stock motor boat is the 28-foot Express Launch, designed by the Elco Company to "Serve the owner on the water as the automobile does on the land." This boat is of the open type, provided with a 40-horsepower, four-cylinder, four-cycle engine located under the forward deck, and able to drive the hull at a guaranteed speed of 20 miles an hour. This boat seats eight passengers, and is sold for $1,950, complete. For the same purpose, this company also produce a 35-foot open boat of similar lines, but provided with a six-cylinder, sixty-horsepower motor that delivers a guaranteed speed of 24 miles an hour to the craft. This 35-footer sells for $4,000, complete.

The motor boat industry practically found origin about twenty-five years ago in the naptha launch. This was made in stock models of various sizes by the Gas Engine & Power Company, who were one of the pioneers in the industry. To-day this company is producing the gasoline motor boat in three stock sizes, viz., 20, 25 and 30 feet long. The first of these is provided with a 10-horsepower, two-cylinder engine giving a speed of 10 miles per hour. The price of this complete craft is $1,800. The 25-footer is equipped

The Elco Express was designed to fulfill the average requirements of this type of craft.

The Dixie Juniors are examples of the stock trend in the field of the speed boat. This is the first photograph of one of this class taken in action.

with a three-cylinder, 14-horsepower motor giving a speed of 12 miles per hour, and sells for $2,250; while the largest size is a 15-miler selling for $2,650, and is provided with a four-cylinder, 22-horsepower power plant.

The Reliance Motor Boat Company has a number of stock designs to which boats are built on order, like the famous Three Twins, Peter Pan, etc., but the little 21-foot runabout shown in the photograph is this company's stock motor boat in the sense in which we are using the term. She is a trim little boat of 4-foot beam equipped with a 20 h.p. 4-cycle motor which drives her 20 real miles an hour. The fact that this boat is built with the same skill and materials which this company puts into its larger and more expensive boats, and sells for only $900, is making it an extremely popular model.

Magnet, the Lawley runabout, also illustrated, is another excellent example of the stock runabout. She is a 30-footer of 5 feet 6 inches beam and her 18-25 h.p. Sterling motor drives her 14 miles an hour.

But the production of successful stock motor boats has not stopped at these sizes. One of the most popular stock models produced by the Elco Company is the 40-foot cruiser, provided with sleeping accommodations for seven persons. The power plant of this cruiser consists of a 20-horsepower Standard motor placed in a separate engine compartment just forward of the raised stern deck. When it is realized that in no class of boat is there a greater variety of cockpit and cabin arrangements possible than will be found in the cruiser, and that this fact enables each intending owner to give vent to his "individual ideas," it will be understood that the cruiser which can successfully meet all of these opinions and requirements in a single stock model must embody the perfection of design in every detail. This boat sells for $4,500, and is one of the most striking exemplifications of the practicability of the stock model boat of large size.

But this same company are carrying the stock motor boat idea into even the larger sizes, and to-day a 54-foot day cruiser can be ordered and purchased the same day. In this model, the motor is located under the bow in a separate compartment. Aft of this compartment is a raised deck provided with a canopy top, and affording an unobstructed view in all directions. Amidships is located a luxuriously fitted cabin from which a spacious stern deck may be reached.

This day cruiser is probably one of the largest bona-fide stock motor boats that has been successfully constructed, although indications point to the fact that in the future, even this size may be exceeded. As soon as a certain model gives promise of being adapted to the needs of a large number of purchasers, it becomes a profitable stock boat proposition, of benefit to builder and buyer alike. But a large stock model may represent an investment of from $15,000 to $20,000 for each boat, and this amount will remain "tied up" for every craft that remains unsold. Consequently, even though 87-foot stock models have been produced, it is probable that such a size will be considered impracticable for a while at least.

The hydroplane has entered the ranks of the stock boat, and we find several 20-footers that are made in quantities and sold with a positive speed guarantee, as described in the last issue. In fact, it is only because these hydroplanes are stock boats, designed along thoroughly tried-out lines and provided with a motor of known power and reliability that has been severely tested and investigated by the boat builder, that a positive speed guarantee can be furnished. One of these stock 20-foot hydroplane models, having a guaranteed speed of 35 miles an hour, is the Elco-plane of the well-known "Bug" type. These stock hydroplanes are sold for $4,000.

The Dixie Juniors, designed by Tams, Lemoine & Crane, are also stock hydroplanes 20 feet long, equipped with Sterling motors of 45-65 horsepower and guaranteed to attain a speed of 35 miles an hour. These boats sell for $4,500, and six have already been turned out to the same design by the Staten Island Ship Building Company.

From the foregoing paragraphs, it will be observed that the definite speed and quality guarantee, with the possibility of immediate tests, forms one of the great advantages of the stock motor boat. But more than this, the concern from which the stock boat is purchased must have a reputation for fair dealing and business responsibility; and the fact that many of the leaders among such concerns have stood as the foremost exponents of the stock motor boat proclaims the important position that such a craft now holds in the marine world.

The Illumination of Motor Boats.

A Discussion of Electric Lighting and Some Suggestions for Installing the System in the Motor Boat.

By R. E. Scott.

IT is generally conceded that a motor boat will return larger dividends in pleasure and recreation, considering the money invested, than almost anything else in the same category. A good motor boat is comparatively inexpensive and low in maintenance cost, much more so, in fact, than an automobile. But the present popularity of the motor boat is due to some extent to the activity of boat builders and appliance manufacturers who have combined in developing new ideas and appliances making for comfort and safety.

Electric lighting systems for motor boats have been successfully operated for a number of years, longer, in fact, than for automobiles, and as a result the reliability of the systems used has been proved by long usage. The manufacturers in the field, however, have increased their activities in late years due to the advent of the tungsten filament lamp suitable for this service.

The convenience of reliable electric lighting systems can hardly be overestimated, while safety is a factor of equal or greater importance. It has often been demonstrated that an open flame illuminant is a positive source of danger on a gasoline motor boat. This is especially true in the smaller sized boats because the engine and fuel tanks are more likely to be exposed, but there are still people who will investigate a leaky gasoline tank or pipe by the light of a match.

On the usual pleasure craft, quarters are necessarily somewhat cramped and the proper ventilation of the cabin is often made impossible. An electric light consumes no oxygen and does not vitiate the air as does an oil lamp. The adoption of electricity has lessened to a large extent the labor of maintaining running lights in good condition. Spray and wind will not extinguish electric lights, which may happen in the case of oil lamps.

The electric searchlight, too, is a real boon to the owner of a motor boat, being clear, odorless, effective and easily maintained. It is extremely powerful and will easily detect floating logs and debris at a distance of from 500 to 1,000 feet, thus lessening a common source of danger found especially in inland waters. It is also invaluable for picking up buoys and making landings. These searchlights, equipped with highly efficient silvered parabolic reflectors and Mazda lamps, give thorough satisfaction. The lamps are water tight, obviating deterioration of the reflector. When equipped with a 20 candlepower Mazda lamp they will give as high as 22,000 apparent candlepower. The lamps used are of a special coiled filament type and work remarkably well with the parabolic reflector.

In addition to the convenience of electric lights themselves, the system affords a reliable source of current for ignition, portable trouble lamps, cigar lighters, electric horns, whistles and fans. These appliances alone tend greatly to increase the adaptability and convenience of motor boats.

There are a number of boat lighting systems

(*Continued on page 86.*)

British Gasoline-Kerosene Engines.

By J. Rendell Wilson.

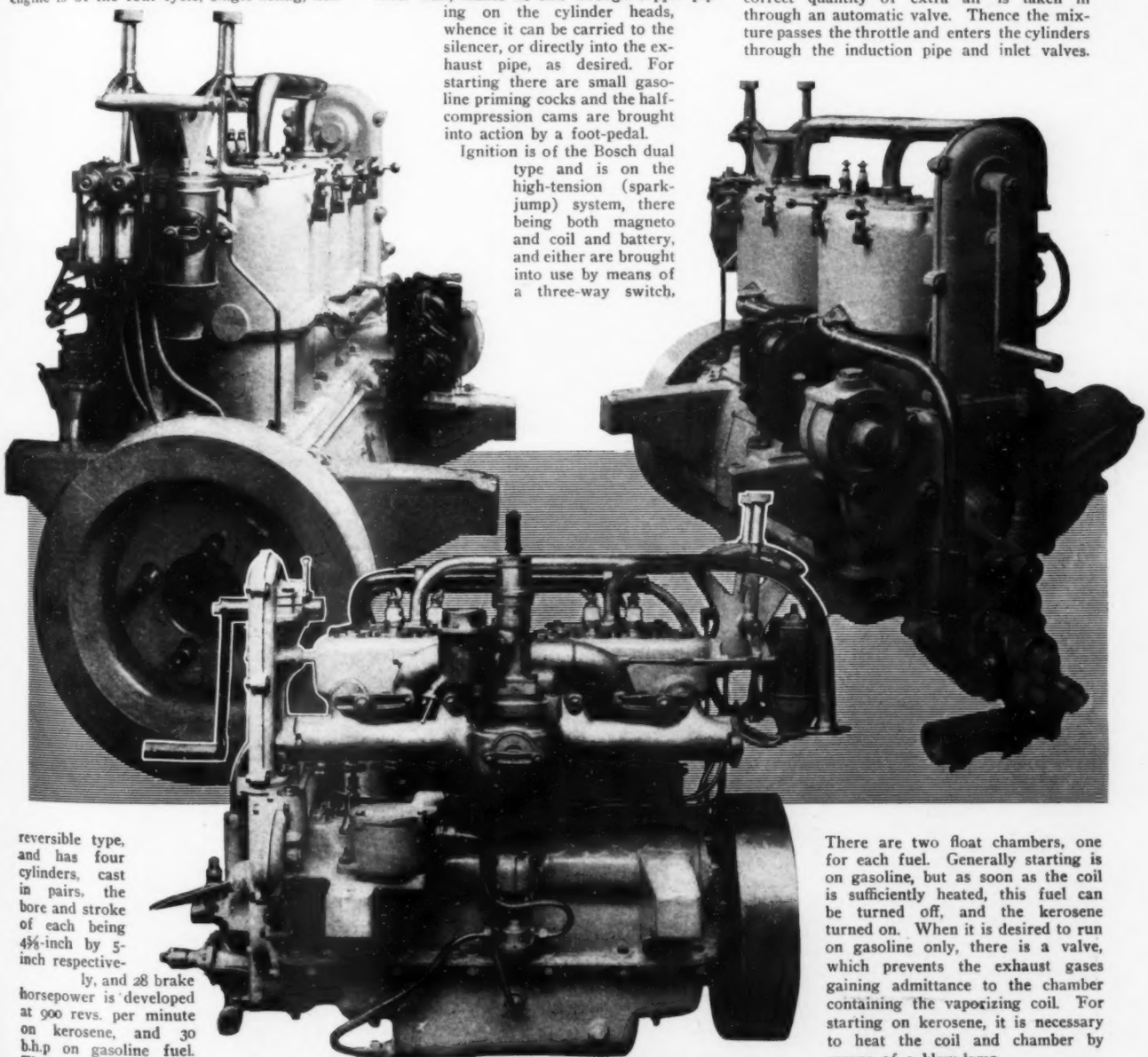
No. 5—The Wolseley

ALTHOUGH just over three years have elapsed since the Duke of Westminsters famous twin-screw racer "Ursula" was launched, she still holds the world's record for the speed of a displacement boat, namely 37.9 knots (43.6 m.p.h.), which she attained at Monaco on April 10th, 1910. Except for the period during which one of her two 400 H.P. Wolseley engines was installed in the hydroplane "Pioneer," both machines ran like two Greenwich clocks. At the time of writing they are being re-installed in "Ursula" for the Monaco Meeting of 1912, where it is expected that she will again win honors for her owner. Credit is due to a concern that can turn out high-speed racing engines that will stand many years hard gaff, and still be in excellent condition.

The Wolseley Tool & Motor Car Co., Ltd., of Adderley Park, Birmingham, place just as much care and thought in the design and construction of their ordinary marine engines, consequently it will be difficult to find any faults in their 30 h.p. gasoline-kerosene motor, which is illustrated on this page. The engine is of the four-cycle, single-acting, non-reversible type, and has four cylinders, cast in pairs, the bore and stroke of each being 4⅜-inch by 5-inch respectively, and 28 brake horsepower is developed at 900 revs. per minute on kerosene, and 30 b.h.p on gasoline fuel. These powers are obtained for a four hours' continuous run on the test-bed at the works, which the purchaser is always permitted to witness. The cylinders are mounted on an aluminum crankcase, which is constructed in two detachable halves, while the valves, of the mushroom type, are all arranged on the port side, and are actuated by cams and tappets, the camshaft being operated by two to one gearing off the crankshaft in the usual manner.

At the after end is a fairly heavy flywheel, while the chain starting gear is at the forward end, a special feature of this being that it is entirely enclosed in an aluminum casing. All pistons are accurately ground before fitting in position and each is equipped with three rings. Water cooling is effected by a rotary gear-wheel pump, driven by a reduction gearing off the forward end of the crank-shaft, and the water enters the cylinder jackets on the starboard side and passing round the cylinder wall, makes its exit through copper piping on the cylinder heads, whence it can be carried to the silencer, or directly into the exhaust pipe, as desired. For starting there are small gasoline priming cocks and the half-compression cams are brought into action by a foot-pedal.

Ignition is of the Bosch dual type and is on the high-tension (spark-jump) system, there being both magneto and coil and battery, and either are brought into use by means of a three-way switch, mounted just under the control levers, at the after end of the engine. The magneto itself is driven by gearing from the crank-shaft, and is mounted on one of the crank-case bearer arms, on the starboard side. Lubrication of the main-bearings and cylinder walls is by force feed from a small rotary pump actuated off the cam-shaft, the oil first passing through a filter on the port side, thence to a sight feed on control mount, whence it flows to the bearings, and finally to the crankcase sump, where it is, of course, again sucked up by the pump. The big-ends and gudgeon pins are lubricated by splash. The carbureter, which is of a dual pattern, being designed to use either gasoline or kerosene, is mounted on the port side, and is heated by the exhaust gases, when running on the heavier fuel. The exhaust gases are led through a change-over valve, to a chamber, which contains a spiral tube, or coil, through which fuel and a little air are drawn. The hot exhaust gases in passing round this coil, vaporize the kerosene. From the coil, the fuel is drawn into the mixing chamber, where the correct quantity of extra air is taken in through an automatic valve. Thence the mixture passes the throttle and enters the cylinders through the induction pipe and inlet valves.

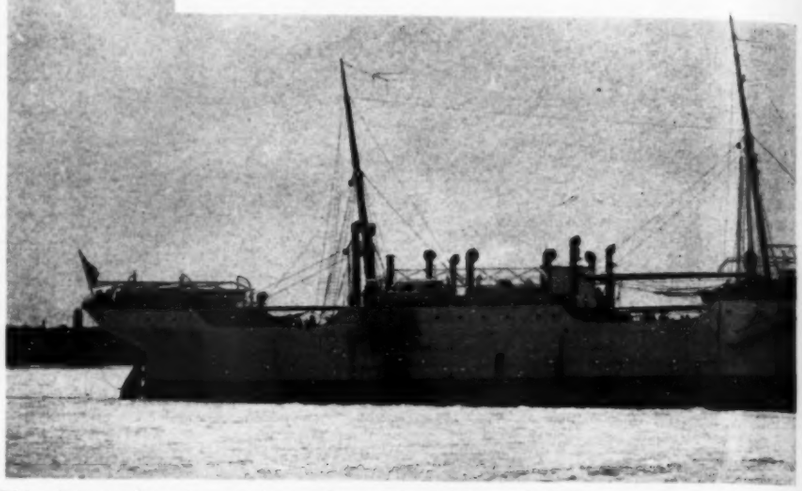


Three views of the Wolseley 30-horsepower gasoline-kerosene motor. Note the forward starter built onto the engine frame, a characteristic feature of a number of foreign motors.

There are two float chambers, one for each fuel. Generally starting is on gasoline, but as soon as the coil is sufficiently heated, this fuel can be turned off, and the kerosene turned on. When it is desired to run on gasoline only, there is a valve, which prevents the exhaust gases gaining admittance to the chamber containing the vaporizing coil. For starting on kerosene, it is necessary to heat the coil and chamber by means of a blow-lamp.

The total weight of the engine and flywheel is 750 lbs.

Selandia the new



This photograph of the ten thousand ton Diesel driven ship Selandia gives an idea of the being led up through the

Only eight men are needed to look after Selandia's power plant.

WITH the trials of Selandia the future of the big motorship is absolutely assured; in fact, immediately following the official acceptance tests, Burmeister & Wain, her builders, were, I understand, inundated with orders for similar vessels from steamship owners who were aboard, and now have enough marine oil engine contracts on hand to keep them busy for about three years. Credit is due to Burmeister & Wain not only for having successfully built the largest full-powered Diesel ship afloat, but for having constructed the machinery, which aggregates 2,500 brake horsepower (3,000 i.h.p.) apart from two auxiliary engines each of 200 b.h.p., in a remarkably short time. How great a stride has been made may be judged from the fact that the largest of the Russian motor vessels, namely Karl Hagelin, has engines aggregating 1,200 h.p. only.

Selandia's trials were carried out at Copenhagen under adverse conditions, having to run through ice, yet a speed of 13.35 knots was attained when running light, although with 950 tons of fuel and fresh water. Her loaded designed speed is 11 knots. She is one of the three combined liner and cargo sisterships for the East Asiatic Company, of Copenhagen, having accommodation for fourteen passengers, and will be used for service between Europe and Siam. Fionia and Jutlandia are her two sisters, and by the time these lines appear in print will doubtless have passed their trials. The first named is also being built and engined on the Clyde, by Burmeister & Wain, while Jutlandia is being constructed and engined by Messrs. Barclay, Curle & Co., Whiteinch, Glasgow, under license.

Bigger motor ships there are, of course, building; but the jump in size and power will have no comparison between that of Selandia and existing vessels of her type.

One of the greatest surprises to engineers and steamship owners present at the trials was that, in addition to the Diesel engines proving perfectly reliable, there was a complete absence of vibration and noise; in fact, it was agreed that her machinery ran more quietly and sweeter than steam engines. When they have been in service for a while, doubtless the running will leave nothing to be desired. Except when starting, or reversing, the exhaust is quite colorless.

On her private trials a week previous she almost collided with the steamer Skandia, but was saved through the prompt reversing of her engines. Only 15 to 20 seconds is necessary to change the direction of rotation from "full ahead" to "full astern."

In addition to these three vessels, the East Asiatic Co. have placed orders with Messrs. Burmeister & ain for eight more motor-ships —two of 10,00 tons and six of 6,000 tons, so the company will soon have a fleet of eleven Diesel vessels aggregating 85,000 tons.

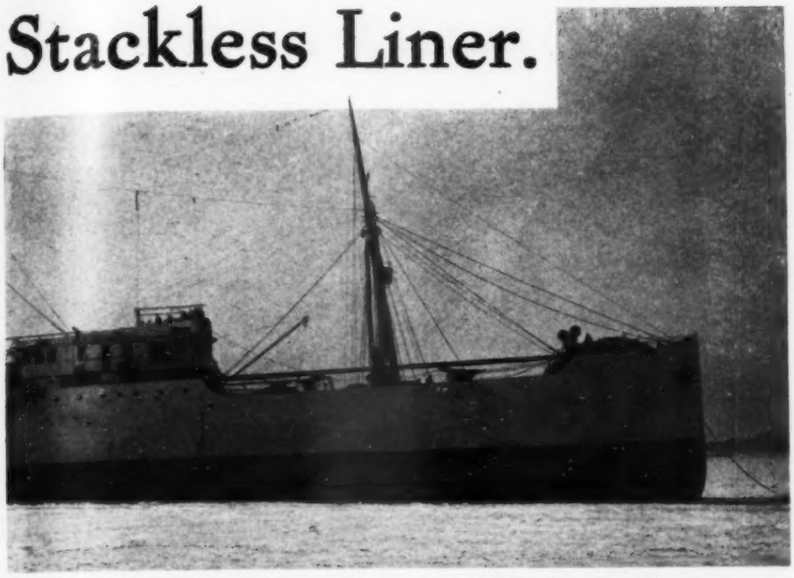
Selandia is 386 ft. in length overall, by 53 ft. beam, with a moulded depth of 30 ft., and 22 ft. 6 ins. loaded draught. Her fully loaded displacement is 9,800 tons, and her dead-weight capacity 7,400 tons. The gross tonnage is 4,900 and the net register 3,200 tons.

A vast amount of space usually given over to bunkers is saved and given over to the cargo. In fact, her double bottom forms the main fuel tank, and has a capacity of 900 tons of oil, which is sufficient to keep her main engines going for a voyage of 20,000 miles under average conditions. Let us imagine the amount of coal that a steamer of the same dead-weight capacity (7,400 tons) would require for a similar cruise. At least 4,500 tons would be necessary, and probably even more.

One of Selandia's eight cylinder motors assembled before placing in the hull. At 140 r. p. m. this motor develops 1,250 brake horsepower.

She is a twin-screw vessel and her main propelling plant consists of two eight-cylinder Burmeister & Wain Diesel engines, each developing 1,250 b.h.p. (1,500 i.h.p.) at 140 revs. per minute; but on the test-bed no difficulty was found in obtaining an additional 150 b.h.p. at slightly higher revolutions. Of the four-cycle single-acting type, each cylinder has a bore and stroke of 20⅞ ins. and 28¾ ins. respectively. With both engines the cylinders are divided into groups of four, the mechanism for controlling and operating the valve gear being between each group. Each set of four cylinders has the cranks set at 180 degrees, and as the two halves are arranged at 90 degrees to each other, perfect running is obtained, which accounts for the absolute lack

Stackless Liner.



appearance of the vessels of the future. There are no funnels, the exhaust from the motors hollow mizzen mast.

Twenty-five stokers and engineers are required to run a steamer of equal tonnage.

of vibration. Another feature toward smooth running is the fitting of four-bladed propellers. The cylinders are mounted on a heavy casing, and are bolted through to very massive engine beds. There are four valves to each cylinder, namely the air-starting valve, air-inlet valve, fuel injection valve, and the exhaust valve. All are operated off one main camshaft on the front of the engine, by means of vertical rods that in turn actuate the rocker-arms on the cylinder head, the rocking movement of the latter opening and closing the valves, as the case may be.

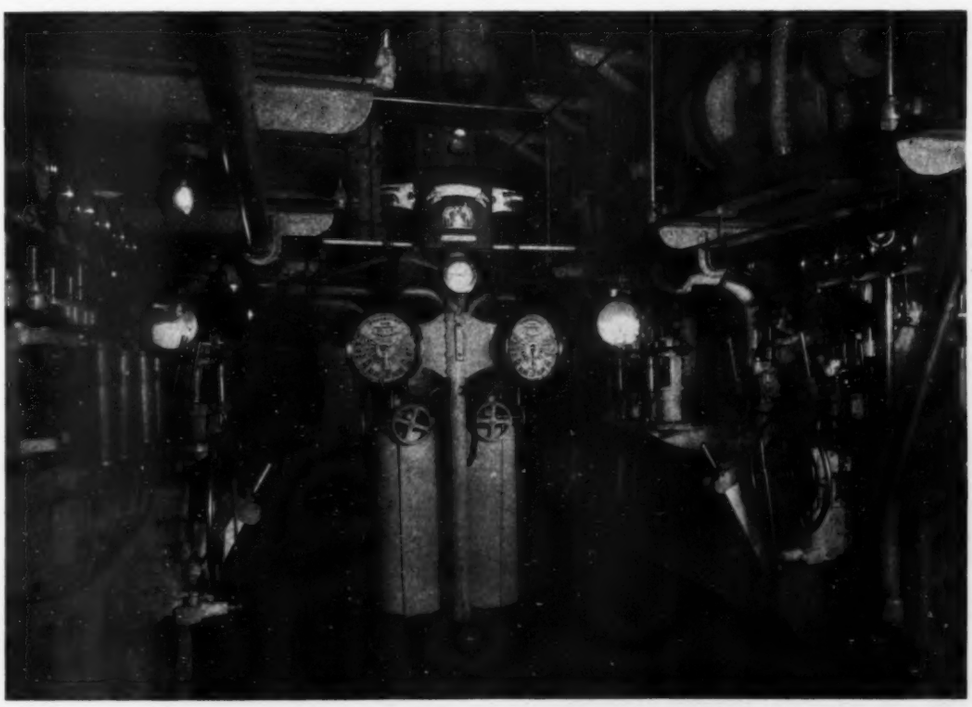
Just over the main camshaft and running parallel with it there is a lay-shaft which lifts the vertical valve operating rods clear of the camshaft for starting, or reversing the engine. How the lay-shaft lifts the valve rods may be made clear in a few words. The lower end of each rod is boot-shaped, the keel carrying the tappet roller, while the toe is connected to a short connecting rod from a crank on the lay-shaft, and so by turning the lay-shaft a half circle the valve rod rollers are lifted clear of the cams, thus throwing all the valves temporarily out of action. The camshaft can then easily be moved into the ahead or astern position. To operate the lay-shaft there is a very small two-cylinder compressed air engine, which is controlled by a single lever. Should, however, this little engine fail, the lay-shaft can be operated by the large hand wheel shown in the illustration. The lay-shaft also slides the camshaft fore and aft for the reverse and ahead positions. Sliding the camshaft brings another set of cams into action. In the center of the lay-shaft can be seen a drum, in periphery of which is cut a diagonal slot, while in the latter runs a disc secured to the camshaft. Thus, as the lay-shaft is given the half-turn, the camshaft slides on its bearings.

There is only one single-stage compressor actually forming part of each engine, and this is driven off the forward end of the crank-shaft, the three-stage compressors being driven by two auxiliary engines of 200 b.h.p. The compressor of each main engine takes the air at 300 lbs. per square inch, and compresses the same to 900 lbs. per square inch, then supplying it to storage bottles. This air is used for fuel injection. For each set of four cylinders there is a separate fuel pump, which delivers the fuel to a distributing box or valve, mounted on the back of each set of cylinders, thence the oil passes to the injection valve of each cylinder. The fuel distributers all have hand regulators so that the fuel supply can easily be controlled, while there is a hand-pump for priming the fuel pipes when starting. Should the propellers suddenly lift from the water, racing is prevented by an Aspinall's governor, which shuts off the fuel supply if the engine exceeds 140 r.p.m., allowing, of course, the fuel to again come into operation immediately the engine speed drops to normal.

Regarding the auxiliary machinery, there are two four-cylinder Diesel engines of 200 b.h.p. apiece, each of which drives a 220-volt dynamo, and a three-stage compressor. Under ordinary conditions only one auxiliary set is kept running, the other being a duplicate, and for use when in harbor to supply the necessary current for operating eight electrical deck winches. The three-stage compressor of each set delivers air at 300 lbs. per square inch to two large storage bottles, which contain enough air to start the main engines 15 times.

The only steam unit aboard the ship is a three-stage compressor set for use in case of emergency, and even the donkey boiler of this is oil-fired. All the other auxiliaries, such as water-pumps, are operated by electricity, with the exception of the fuel and bilge pumps which are driven by an air engine. Although Selandia's machinery is estimated to have cost some $50,000 more than that of a steam-engined vessel, her owners expect to gain $40,000 per annum. How this is to be done is that no less than $25,000 a year will be saved on the fuel bill alone, while compared with a steamship of the same tonnage she can carry 1,000 tons of cargo more. This it is stated will mean $15,000 extra freight receipts. This statement that the motor ship Selandia means a total saving of $50,000 per annum will doubtless be dubiously received in many quarters, but this figure the East Asiatic Co. consider a very reserved one, as it is not based on full cargoes or passenger receipts for every voyage.

J. Rendell Wilson.



Selandia's engine room, showing all the controls of the two main engines. Besides these engines there are two auxiliary ones of 200 horsepower each, also of the Diesel type.

Among the Clubs

The Spring "house-cleaning." Overhauling for the coming season at the club quarters.

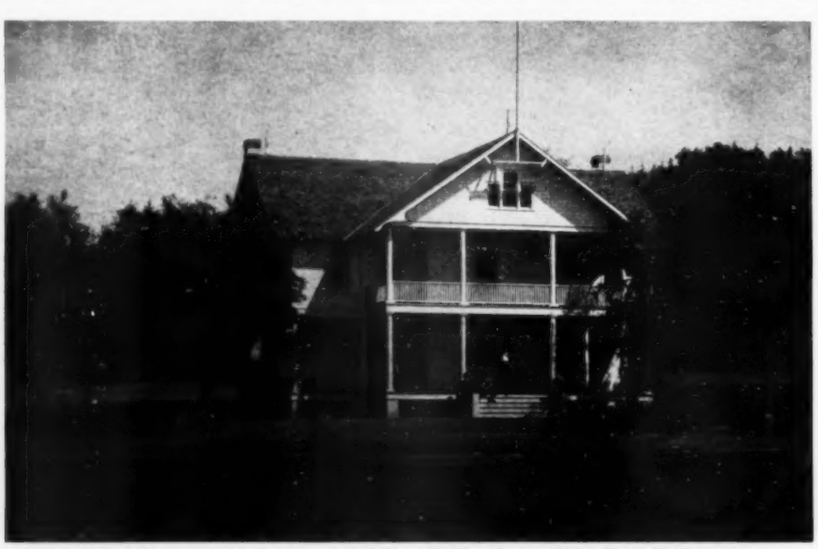
The Camden Motor Boat Club, Camden, N. J., held its second annual banquet a short time ago in the red room of the new Hotel Ridgway. Across the center of the room were suspended the club's signal flags spelling out the word "Welcome." Vice Commodore A. S. Royal acted as toastmaster and in calling on the speakers, paraphrased the name of each so as to make it apply to some useful part of a boat. Some of the allusions were quite witty and caused much laughter. Commodore Dudley, in his address, briefly referred to what had been accomplished in the past and voiced a desire for greater sociability among members and friends of the club and a large increase in membership, this latter not because the club needed financial support but because more members mean more good boats and a greater interest in motor boat racing. In concluding, he referred to a proposed ocean race between Camden and Bensonhurst, L. I., with a return finish at Ocean City, N. J. Speeches were also made by Dr. Chris Street, commodore of the Delaware River Yachting Association, Past Commodore Turner, Peter Hall, Job M. West, Howard J. Demmert, Joseph F. Magee, John Vanderslice, Chas. Wood, William Paul and others. Racing dates announced are: August 14th, a speed race with the start and finish at the Camden club; August 21st, a race for cruisers under the auspices of the Keystone Yacht Club, from Wilmington to Ship John Light and return and August 31st, a speed contest under the auspices of the Delaware River Yachting Association. Officers of the Camden club for 1912 are as follows: Commodore, Howard J. Dudley; vice-commodore, A. Scott Royal; fleet captain, Howard J. Demmert; corresponding secretary, Joseph F. Magee; financial secretary, George W. Johnson; treasurer, Austin M. Clark; measurer, John Vanderslice.

Members of the **Boat Owners' Association of Canandaigua, N. Y.,** and invited guests numbering nearly one hundred, enjoyed a fine banquet at the Canandaigua Hotel recently, at which time a movement was started which may result in joint action by the Boat Association, the Sportman's Club and the Automobile Club to establish a club house on the shore of the lake at some point convenient to the village, where a shooting park will be laid out and other facilities for outdoor sports furnished The proposition was introduced by George Ogg, former president of the boat association. F. D. Cribb acted as toastmaster at the banquet.

The Hudson River Yacht Racing Association has withdrawn from the American Power Boat Association and at its annual meeting adopted a unanimous resolution for the appointment of a committee to make rules under which the 1912 regatta will be held. The association is composed of the following clubs: Albany Yacht Club, Rondout Yacht Club, Poughkeepsie Yacht Club, Newburgh Yacht Club, Highland Boat Club, Shattemuc Yacht Club, Tarrytown Yacht Club, New York Motor Boat Club, Colonial Yacht Club, Tarrytown Boat Club, Tappan Zee Yacht Club and Yonkers Yacht Club, representing in all a membership of nearly 2,000 owners. Commodore Selden of the New York Motor Boat Club stated that the reason given for making the move was that under the rules of the Power Boat Association, racing had tended toward professionalism and the true spirit of amateur contests had in a measure been lost.

As a result of the attitude of the Hudson River association it is probable that a special meeting of the American Power Boat Association will be called shortly to reconsider the changes in the rules adopted at the annual meeting. Although it is admitted that many of the rules are obsolete, the sweeping changes made at the meeting were wholly uncalled for and the action taken at that time has served to increase the antagonism of the western clubs and caused the withdrawal of a number of eastern organizations from membership.

The Mississippi Valley Power Boat Association will hold its 1912 regatta at Davenport, Ia., July 4th, 5th and 6th and cash prizes will be offered in the big classes which are expected to attract some of the best boats in the country. A rumor started the rounds that the Mississippi Valley Association had discontinued the high-speed championship classes and in the future would confine itself to small boats, but the race committee wish it understood that this report is entirely incorrect. The championship classes remain as in the past for 40-foot, 32-foot, 26-foot and 20-foot boats. At a recent meeting of the association three new classes were added for small boats, entrants for which will be confined to members of clubs affiliated with the association. These classes are for one, two and three-cylinder speed boats and are designed to permit the smaller racing men to stay in the game without having to compete with the big champions. The prizes for the different events will amount in the aggregate to $5,000, the 40-foot class alone having a cash prize of $1,000 besides a handsome silver cup for first place.



The homelike new club house of the Eau Gallie Yacht Club, Eau Gallie, Fla.

The Piermont Boat Club, Piermont-on-Hudson, N. Y., at its last monthly meeting elected the following officers for 1912: Commodore,

Hugh Rutter; vice-commodore, Howard Aspinwall; secretary, Chas. B. Longyear; treasurer, Gale Spaulding, and chairman of the house committee, Harry A. Rodger.

The Island City Boating Association, Rock Island, Ill., has been making arrangements to care for some of the boats that will take part in the regatta of the Mississippi Valley Power Boat Association to be held at Davenport, Ia., July 4, 5 and 6. The city council has promised aid in improving the harbor and the club has taken steps to rebuild some of the booms. The following officers were recently elected: Commodore, C. L. Beardsley; vice-commodore, G. Mosenfelder; rear-commodore, George Lehnerer; secretary, V. C. Ruenzel; treasurer, Oscar Litt; trustees, August Heimbeck, H. W. Horst, A. H. Lambert, G. A. Jencke and John Larson.

Home of the Burlington Launch Club, Burlington, Iowa.

The Eau Gallie Yacht Club, Eau Gallie, Fla., held a series of races on February 22nd, the results of which are as follows: Class I, speed boats, 15 miles and over, for a course of 12 miles, won by Jane S., owned by C. S. Smiley; second, Victor, owned by A. C. Baxter; class II, open boats with a speed of less than 15 miles, over a 6-mile course, won by Osceola, owned by O. Currier; second, Eva, owned by P. Frink; class III, cabin boats, over a 6-mile course, won by Carlos II, C. C. Booth owner; second, Lyndon, owned by C. W. Fowler; class IV won by Aurora, owned by Beaujean brothers. On the day of the race the club's new house was formally opened.

The South Shore Power Boat Club is a new organization at Chicago, Ill. D. H. Webb is commodore, Leon W. Crandall, vice-commodore and C. R. Rhodes, secretary. The club is considering the erection of a club house in the vicinity of Jackson Park.

The Fulton Motor Boat Club, 138th Street and Hudson River, New York City, held its annual meeting on February 11th, at which time the following officers were elected: Commodore, Chas. Frelloehr; vice-commodore, Geo. Bernius; rear-commodore, Julius Frelloehr; treasurer, John Kellner, and secretary, Roman Leslie.

The Tappan Zee Yacht Club, Grand View-on-Hudson, N. Y., will hold a race for cabin cruisers 45 feet overall and under on June 22nd and 23rd, from the club anchorage off Grand View to and around a mark off Hudson, N. Y., and return, a distance of 180 miles. The start is to be at 3:30 p.m. and all boats must finish inside a time limit of 27 hours. Entries will be received from owners who are members of any recognized Eastern yacht club and must be in the hands of the regatta committee, with a signed certificate of measurement, not later than June 15th. Owners of boats entered must be aboard during the entire race, but professional crews may be carried. Each entrant must carry full cruising equipment, as that is generally understood and carry or tow a dinghy. Mr. Wm. C. Disbrow, of the Tappan Zee club, has contributed a handsome cup for the event and the yacht club will offer a cup for the boat finishing second and suitable medals for the next four boats finishing.

The St. Augustine Power Boat Club, St. Augustine, Fla., chose the following officers for 1912, at its recent annual election: Commodore, Geo. W. Gibbs; vice-commodore, Seth Perkins; rear-commodore, W. M. Wright; treasurer, Guy Farris; secretary, Chas. F. Hopkins, Jr.; fleet captain, O. F. Iwanowski; board of governors, E. W. Howatt, X. Lopez, A. M. Taylor, H. Muller and J. T. Facetti. Entries for the Southern Championship Races, to be held at St. Augustine, have been received up to date as follows: Vita, Paula H. Blackton, owner; Vita Junior, J. Stuart Blackton, owner; Ruth K and Jane S, both owned by Chas. S. Smiley; Victor, owned by G. F. Paddison; Manker III, C. B. Phelps; Slipper, Geo. W. Spaulding; Baby Dixie, F. B. Siears; Minnow, W. Earl Dodge, and Golden Rod, P. B. Alsobrook.

The St. Paul Motor Boat Club, St. Paul, Minn., is a new organization which has started out with sixty-eight members. The club is located on Harriet Island at the head of Mississippi River navigation. The officers of the new club are: John D. O'Brien, commodore; Edward Parrish, vice-commodore; John A. May, rear-commodore; B. J. Gardner, secretary; Joseph G. Russel, treasurer; F. A. Schletz, fleet captain; F. L. Young, fleet surgeon; Geo. E. Taylor, Mart Sheffer, E. H. Curry and Henry H. Orme, directors. The regulation pennant adopted by the club has a navy blue field with white stripes and the letters S. P. M. B. C. in white. St. Paul now has about 300 motor boat owners, most of whom are expected to join the club.

The Newport Yacht Club, Newport, R. I., held its annual mid-winter banquet February 21st in the banquet hall of the Perry House. The entertainment committee issued the orders for the event from the flagship Wooglin, including the following rules: "Classification will be based on overall measurement, multiplying the greatest circumference of the belt area by the square root of the top sides and dividing by the tank capacity. No time allowance for age or tonnage. Where there is but one captain in a class, he will drink in the class next above. All sailors must sail in light cruising trim, hatches open and ready for stores and with no gasoline or other liquids previously and secretly stowed abaft the binnacle."

The Twin City Power Boat Club has been recently formed by motor boat owners of La Salle and Peru, Ill. Officers were elected as follows: F. B. Gerard, commodore; H. B. Singer, vice-commodore; William E. Stafford, rear-commodore; A. J. Schmitt, secretary, and L. J. Rigden, treasurer, all of La Salle. Directors are Chas. Janz and Frank Wehr, of Peru, and Dave Neustadt and Richard Johns, from La Salle. The new club starts out with a membership of thirty, and has joined the Western Power Boat Association.

The Waterway League of Greater New York and Long Island held its annual election of officers February 13th, at which time the following were chosen to serve for 1912: President, Commodore, William A. Strong, Nassau Y. C.; 1st vice-president, Commodore Jos. B. Acker, Canarsie Y. C.; 2nd vice-president, Herman A. Metz, Brooklyn Y. C.; 3rd vice-president, Commodore Jos. W. Masters, Belle Harbor Y. C.; treasurer, Fred Reid; corresponding secretary, Otto B. Schmidt, Canarsie Y. C.; chairman of the board of governors, Commodore Wm. J. Moran, Jamaica Bay Y. C.

The Log Book of the **Bayside Yacht Club** of Bayside, L. I., has an interesting table showing the 1911 racing record of the Bayside one-design class in eleven races held in foreign waters, and it is a record of which the club may well be proud. A new class, known as the "birds," will make their initial appearance in the coming racing season. The club's first event is scheduled for May 4th and will be from Nevin's Yard, City Island, to the club house.

The Jacksonville Power Boat Club, Jacksonville, Fla., is receiving enthusiastic support in its effort to hold a large motor boat regatta at that city during the second week in April. Leading citizens are helping the regatta fund along with liberal subscriptions and the only serious obstacle seems to be the short time available in which to make preparations. The course is well suited for holding speed contests and it is hoped to have some of the well-known racers from the East at the regatta.

(Continued on page 75.)

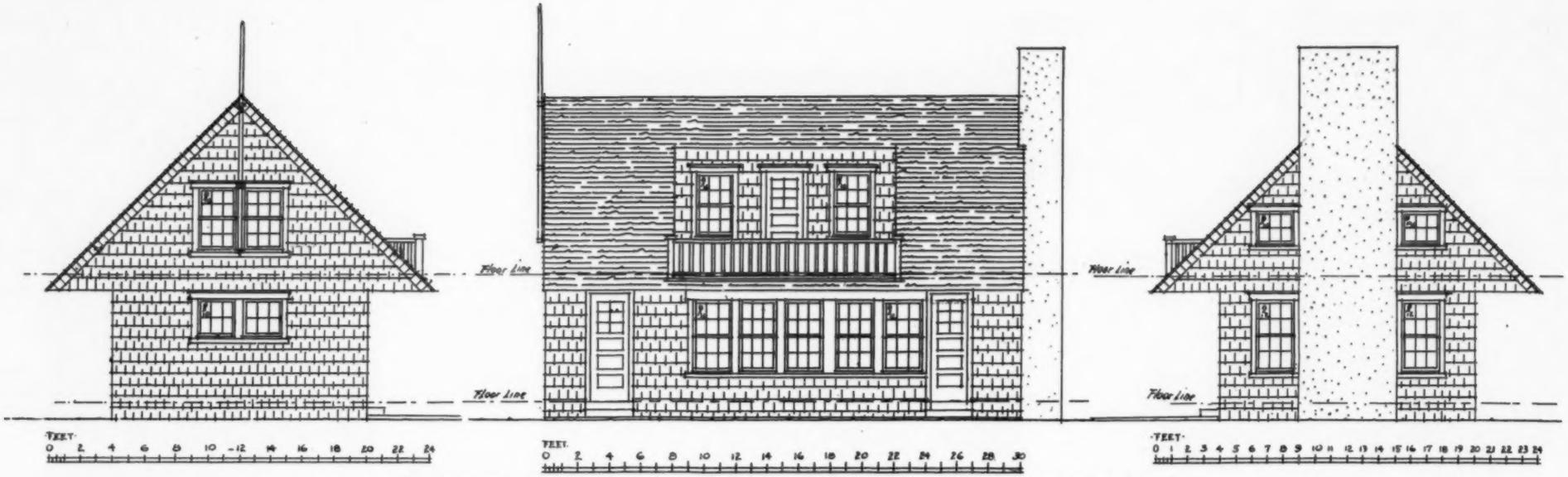
Tide Table for April.

NOTE: This table was compiled for the Port of New York. To find the time of high or low water at other points, add or subtract the increment given in the table.

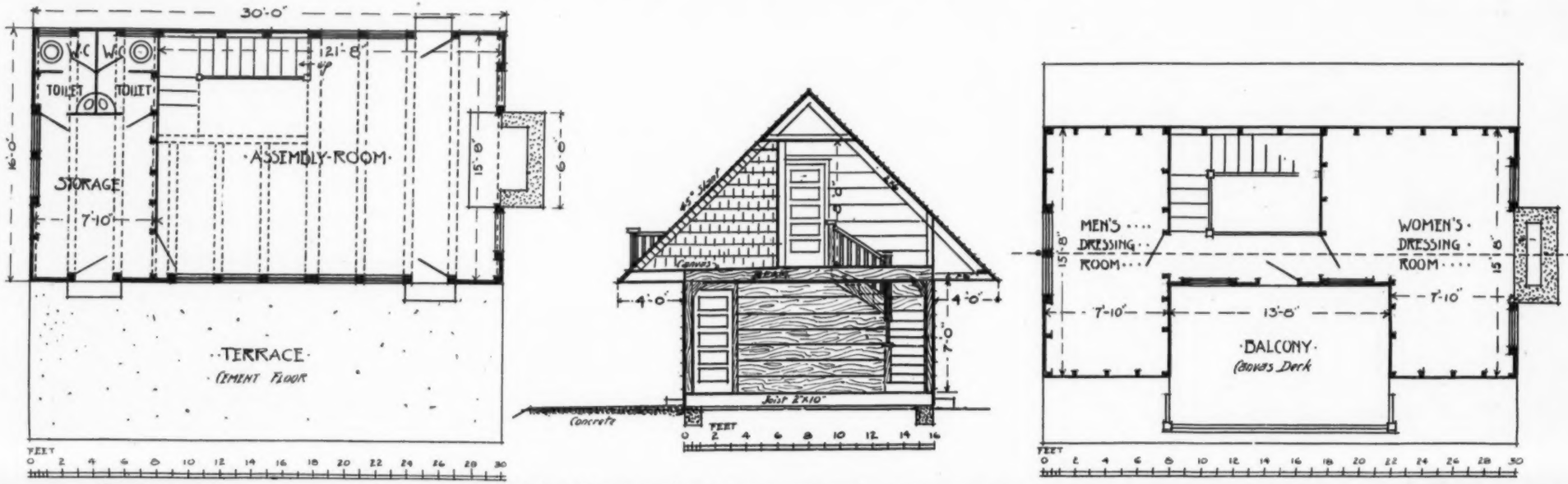
DAY OF MO.	WEEK	HIGH WATER A.M.	HIGH WATER P.M.	LOW WATER A.M.	LOW WATER P.M.
1	Mon.	7:40	8:03	1:38	1:58
2	Tu.	8:24	8:44	2:24	2:40
3	Wed.	9:08	9:24	3:08	3:20
4	Thu.	9:48	10:03	3:53	4:02
5	Fri	10:29	10:45	4:40	4:42
6	Sat.	11:10	11:27	5:27	5:24
7	Sun.	11:54	.....	6:20	6:12
8	Mon.	12:12	12:50	7:17	7:10
9	Tu.	1:04	2:08	8:18	8:22
10	Wed.	2:06	3:25	9:20	9:31
11	Thu.	3:14	4:20	10:14	10:28
12	Fri.	4:12	5:00	10:58	11:17
13	Sat.	5:01	5:36	11:37	11:58
14	Sun.	5:43	6:08	12:13	.....
15	Mon.	6:21	6:43	12:37	12:47
16	Tu.	6:58	7:19	1:15	1:20
17	Wed.	7:33	7:57	1:54	1:54
18	Thu.	8:10	8:37	2:31	2:29
19	Fri.	8:52	9:18	3:12	3:05
20	Sat.	9:35	10:04	3:57	3:45
21	Sun.	10:20	10:52	4:40	4:30
22	Mon.	11:15	11:48	5:40	5:27
23	Tu.	.....	12:20	6:47	6:43
24	Wed.	12:53	1:50	8:00	8:17
25	Thu.	2:13	3:20	9:12	9:41
26	Fri.	3:35	4:30	10:16	10:50
27	Sat.	4:44	5:25	11:13	11:46
28	Sun.	5:42	6:10	12:02	.....
29	Mon.	6:34	6:55	12:37	12:50
30	Tu.	7:20	7:37	1:24	1:32

To find the time of high or low water at any of the following points add (+) or subtract (—) the following times from the time of high or low water at New York:

Halifax	—0:06	Yonkers	+0:56
Portland	+2:35	West Point	+3:39
Boston	+3:02	Albany	+9:54
Portsmouth	+2:56	Sandy Hook	—0:40
Gloucester	+2:57	Philadelphia	—0:36
Newport	—1:07	Cape May	—0:11
Block Island	—1:17	Baltimore	—1:28
New London	+1:05	Washington	+0:05
Hartford	+8:43	Old Pt. Comfort	+0:28
New Haven	+2:58	Savannah	—1:28
Bridgeport	+2:52	Key West	+0:11
Willet's Pt.	+3:02	Galveston	+2:44



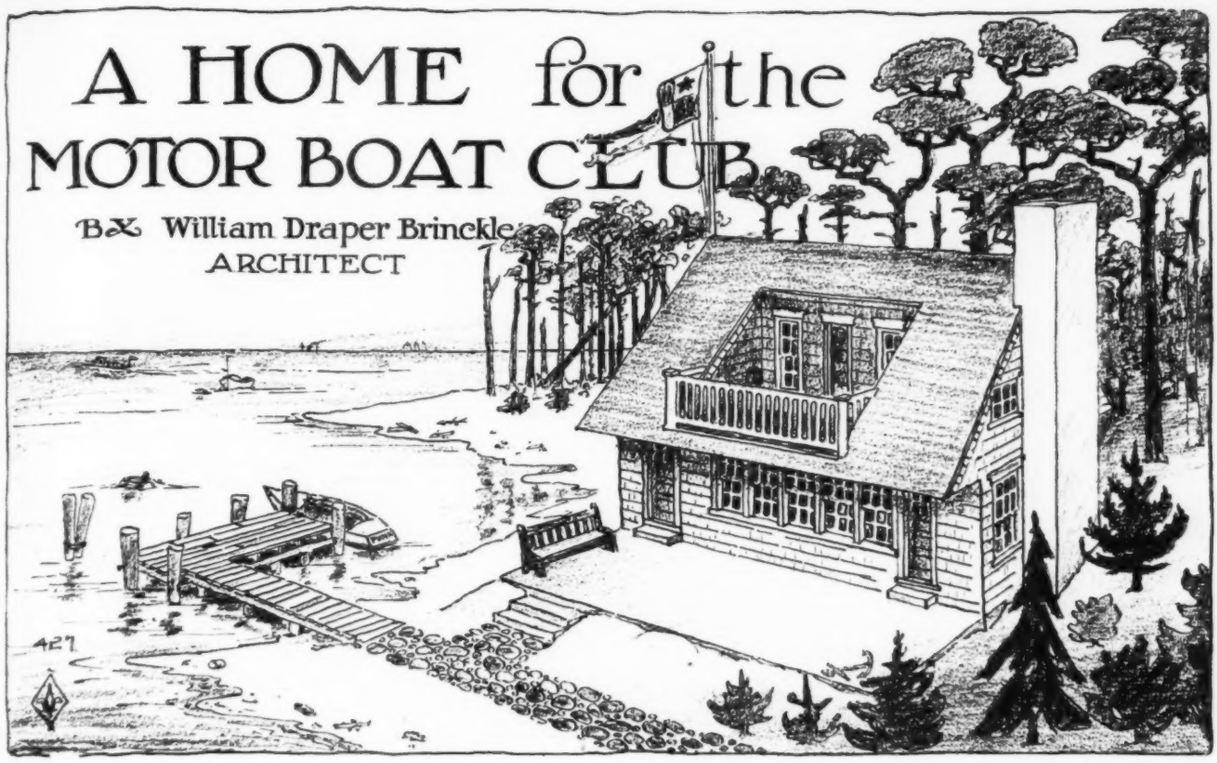
The front and end elevations of the inexpensive motor boat club house described by Mr. Brinckle.



There is a large concrete terrace in front of the house sheltered by the overhanging eaves, and on the second floor there is a lookout or observa tion balcony with a canvas covered deck.

A HOME for the MOTOR BOAT CLUB

By William Draper Brinckle
ARCHITECT



An Inexpensive Structure That Fulfills All the Requirements of the Small Organization.

"NO, we haven't any club, now; the fellows lost interest and it all went to smash."

Let's question a bit further. "Did you have any club house?"

"Oh, yes; that is, we had a little shack over on Skunk River, but somehow——"

"Nice, cosy, little sort of place?"

"No-o-o; fact is, it was just a builder's shed, you know; we only wanted a place to stow the oars from the dinks, and all that sort of stuff."

Exactly, and yet some folks can't seem to realize that not one club in a thousand will hold together after the "new broom" period, unless there be a comfortable, complete club home as the center of the club life. It matters not whether it be an archaeological association or a motor boat club, homelessness spells "smash" in either case.

One must have a club house, then; that's settled. But what's the next step?

Now, too many folk assume that because they can plan a boat quite reasonably well, therefore they can plan a club house offhand; yet I once took on a ship draughtsman, when architectural draughtsmen were scarce, and he was as absolutely helpless at house designing as one could possibly conceive. Besides, you know what sort of Noah's ark an amateur turns out when he tries his hand at boat designing, don't you? And the amateur house planner is certain to make quite as rank a mess of things; I've seen it a hundred times.

Now, among all the designs for garages, bungalows, well curbs, chicken coops, and so forth, that crowd the pages of the various magazines, I don't think I ever saw a motor boat club house, did you? Well, at any rate, let's consider it a moment.

The requirements of the average small club house are these:

1. A large, comfortable assembly room, of sufficient size for guests at club events, though meant chiefly as a members' waiting and lounging room.

2. A storage room, to hold boat equipment, oars, etc.

3. A dressing room for the men, where wet clothing may be changed or boat rig put on.

The benefit of a home to the young motor boat club can scarcely be overestimated. It is the tangible part of the organization and without it the chances of success are limited. With new clubs springing into existence on all sides there is a great demand for a small, inexpensive club house and, while it is not expected that in every case the design described in this article will be followed literally, it embodies a number of excellent features and should offer a basis on which to work.—Editor.

4. A similar room for the women.

5. Ample porches and balconies, from which to watch races.

6. Proper toilet rooms for both sexes.

That's all; though, of course, one may elaborate and enlarge to any desired extent. So let's consider the construction next.

A cellar isn't needed, for the club house is closed during the bitter weather and, therefore, no heating plant is to be provided for. So we put in a pair of foundations, with concrete, stone or brick, and rest the floor joists on these, just clearing the ground. The floor is soft pine; later on hardwood may be put down on top of this if desired.

The wall studding is all planed pine or hemlock, 2 x 4 in., and in the assembly room, the studs are blocked in pairs, 2 in. apart, cased on the room face, this gives the effect of heavy 5 x 6 in. posts. The walls are sheated with wide pine or hemlock boards, planed, of course, and the outside covered by two thickness cypress or redwood shingles.

The first story ceiling joists are planed, blocked together in pairs, and cased on the underside, in the same manner as the studding; then the second story floor boards, planed underneath, are laid down on top of these. So we get a beamed ceiling of (apparently) 6 x 10 in. timbers; and extremely effective it is, too. I have used it in some very high-class residences, by the way. Besides, this scheme saves quite a few dollars, because one can have the ceiling at least a foot lower than if the ordinary plaster or board affair were put at the bottom of the joists. Then "knees," suggestive of marine construction, are put in the angle of stud and cealing beam, and the first story is finished.

The second story is much the same, only we don't attempt to build up the rafters and the studs but merely plane them, and let it go at that. Beaded boards sheath the roof; on these the shingles are nailed. The deck of the balcony is planked, with a slight slant outboard, and then covered with painted canvas, boat fashion.

The fireplace is a big affair, four feet wide and three high; it may be built of brick, stone or solid concrete. The chimney is of the same material, only the outside must be plastered. I'll explain why later. At need, a small stove can be set up in the women's room, to give a bit of heat there.

It's very nice to have plumbing, of course, but plumbing presupposes a water supply system, and that spells "cash" at the first jump. So I've supposed two ship's lavoratories in the toilet rooms and two earth closets adjoining. An earth closet, properly arranged, is absolutely sanitary. Just take a good, tight half-barrel, place it underneath the seat, and provide a box of dry earth with a handy little fire shovel. The great secret is to use plenty of earth—there isn't a better disinfectant known to science. Of course, a small door must be so placed that the half-barrel may be hauled out and emptied occasionally.

In place of a porch, we have a cement floored terrace; the overhanging eaves give this quite sufficient shelter. The balcony has no roof, but an awning may very easily be arranged on iron stanchions here.

The colors and the finish? Well, the roof will turn gray, naturally, and the doors had best be green. But the side shingles and all other woodwork must be white; the chimney (you'll recall) is plastered; and now we'll whitewash it. Did you ever notice how extremely harmonious white is against any background and amid any surroundings? It's especially so, when there's water and sky in the picture, a white hull, a white sail, a white lighthouse or a white sea gull. In theory gray is the best color for a shingle-sided house, but you'll drop this theory quickly enough when you've seen the charming old white shingle cottages along the Delaware and Chesapeake tidewater.

(*Continued on page* 54.)

THE PRIZE CONTEST IN QUESTIONS AND ANSWERS

A GREAT deal more space has been devoted to the discussion of cabin interior arrangement than to the layout of the deck and cockpit, and because of this fact, a question on the latter subject was announced in the February issue. The answers are given herewith and include many suggestions that should be of benefit to the owners and prospective owners of this type of craft.

IN the second set of answers the various woods used in boat building are discussed, with their characteristics and suitability for various parts of the hull. It is an extremely interesting subject and if you are not familiar with the building of boats these answers should give you sufficient information to enable you to judge of the quality of a boat from her specifications.

IF you have ever put a boat into commission you know what a discouraging sight the oak trim presents, especially after a winter's exposure. Perhaps you have already arrived at a satisfactory method of refinishing it, but if you haven't look over the answers to the third question. They cover the subject thoroughly.

THE QUESTIONS FOR THE JUNE CONTEST ARE THESE:

Give description and drawings for the construction of a switchboard for controlling all the electrical apparatus from the same point.

Suggested by Dr. L. H. Prince, Philadelphia.

What is the best method of fitting up a mooring for a motor boat? (Sketches if necessary).

Suggested by A. O. G., Portland, Me.

Describe the simplest and most satisfactory type of toilet for a small or medium size cruiser, with general instructions for its installation.

Suggested by Edward Gibson, Detroit, Mich.

ANSWERS to these questions, addressed to the Editor of MoToR BoatinG, 381 Fourth Ave., New York, must be: (*a*) In our hands on or before April 25, (*b*) not over 500 words long, (*c*) written on one side of the paper only, (*d*) accompanied by the senders' names and addresses. (The name will be withheld and initials or a pseudonym used if this is desired.) Questions for the next contest should reach us on or before the 25th of April.

THE PRIZES ARE:

For each of the best answers to the questions above, *any* article advertised in MoToR BoatinG, of which the advertised price does not exceed $25, or a credit of $25 on *any article* advertised in MoToR BoatinG, which sells for more than that amount.

(There are three prizes, one for each question, and a contestant need send in an answer to but one, if he does not care to answer all.)

For each of the questions selected for use in the next contest, *any article* advertised in MoToR BoatinG, of which the advertised price does not exceed $5, or a credit of $5 on *any article* advertised in MoToR BoatinG, which sells for more than that amount.

For all non-prize-winning answers published we will pay space rates.

When You Send in Your Answers, state what you will take if you win a prize.

Exterior Arrangement for Cruisers.

A Number of Convenient Lay-Outs Described and Illustrated for the Deck and Cockpit of the 30-Foot Cabin Cruiser.

THE PRIZE CONTEST—Answers to the First Question in the February Issue.

For the Average Boat.

The Prize-Winning Answer.

(Prize Won—3-A Eastman Kodak.)

THE plan shows the deck and cockpit arrangement for a 30 x 8-foot raised deck cruiser. Varnished oak or mahogany "washboards" about ⅞ inch thick extend around the deck near the edge, and are about 3 inches high at the bow tapering down to 1 inch at the end of deck. Drainage holes for deck water should be cut at intervals on each side. These boards give a neat clean-cut finish to the deck and also provide good foothold.

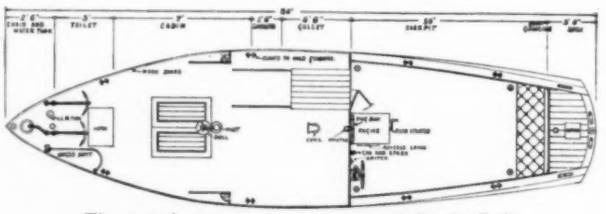
The headlight is held on the bow flagstaff near the deck. The anchors should be kept slightly above the deck on blocks notched out to receive them and secured to these by lashings through ring bolts. A regular pattern anchor davit with a square socket on each side of the deck to hold it may be used. The folding davit shown is a good rig and was illustrated and described by Chas. McIlroy in April 1911 MoToR BoatinG. The hatch opening from the toilet room should be hinged aft and can be held open with a hook for ventilation. It should be large enough to serve as an emergency exit and also to stand in when handling ground tackle in rough water. A couple of ring bolts in the deck between this hatch and the skylight will be found handy to lash down the anchor line when it is coiled on deck.

The skylight comes over the center of the cabin and is about three feet square. The mast is just aft of this and several good arrangements for attaching it to the deck are shown in February 1911 MoToR BoatinG. The fog bell looks well hung forward or aft on this a little distance above the deck. The companion hatch is placed on the starboard side.

The engine, extending into the cockpit is covered by a ventilated removable box-like arrangement with suitable doors. The steering wheel, compass and binnacle are mounted on the bulkhead at port side. The switch, gas and spark, as well as the reverse lever are all at the steersman's right hand. Several good forms of steersman's seat are given in November 1911 MoToR BoatinG.

Wicker or folding chairs are much more comfortable than side seats in the cockpit. A lazy-back seat is placed across aft and under this and the stern deck are the gasoline tanks. A hatch in the deck gives ready access to the rudder gear. Oak bitts and side chocks are fitted at bow and stern, also two closed chocks at stern for towing. The after "range light" can be carried on the flagstaff if it is high enough, or supported on the awning frame or on a raised holder at end of cabin. Several good awnings and fittings are shown in December 1911 MoToR BoatinG.

R. S. D., Detroit, Mich.



The exterior arrangement suggested by R. S. D.

The Combination Type.

THE term "cruiser" as applied to the powerboat is oftentimes very indefinite, as many of the type so-called are used almost entirely for day trips and not for extended runs. In the accompanying plan, however, the suggested subject of deck and cockpit arrangement for a cruiser has been taken literally and the object has been to provide the best all-round accommodations in a boat of 30 ft. over-all length for a party of two or three for actual cruising.

The cabin has been made as large as is possible while leaving enough room outside to seat a small party. The forward end of the self-bailing cockpit is elevated

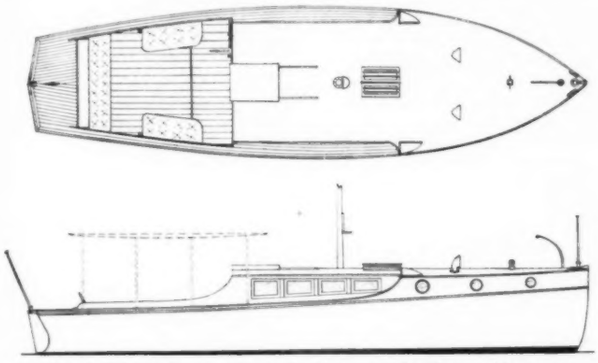
to form a helmsman's bridge, which is in part removable to give access to the engine installed beneath. The wheel and controls are on the bulkhead and the reverse lever is led up through the floor. This arrangement keeps the cabin fairly clear of machinery, which is most desirable in a craft of this size.

The gasoline tanks are placed under the side seats in the cockpit and are cylindrical, being provided with drip pans to drain outboard. The port seat may be used by the helmsman when making a run in open water where an unobstructed view over the deck is not absolutely necessary. Under the after seat and deck is a suitable space for stowage.

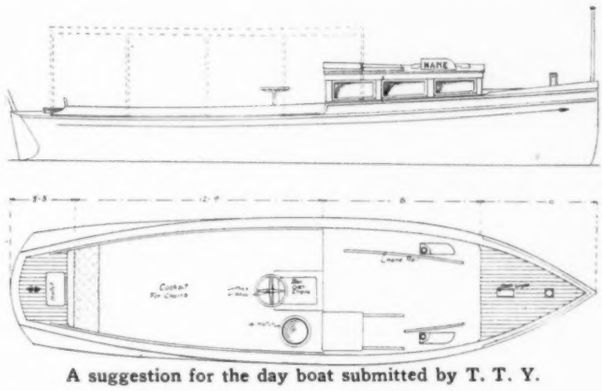
The deck is to be canvas covered and painted. For a space of eight feet forward in the cabin and the clutch extends under the hatch in cockpit floor. The hatch coaming is about 6 inches high, set in flannel and white lead, and hatch cover makes a convenient steering platform. Aft of this is a brass manhole plate and flange, about 12 in. diameter. The cover fits flange accurately, and is watertight, but cover is easily removed to get at the stuffing box below.

A 20 gal. gasoline tank is slung up under a seat on each side of after end of cockpit, with a galvanized iron drip pan underneath, scuppered overboard, to take care of any leaks. Tanks fill from the deck through plates G, G, Fig. 1; small vents (V, V) are brought up through the seats so that (G, G) will be watertight when screwed down. There 3) below wheel is removable and with that and hatch below removed the after end of engine is exposed. There is a long swinging door under each cockpit seat, so that the gasoline tanks and piping can be reached.

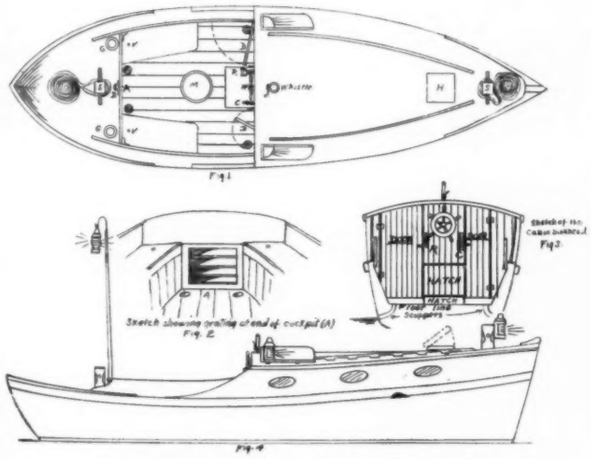
Now for the forward deck. The cabin top is canvas covered and painted a buff color. A hatch 18 in. or 20 in. square is forward; this has a double hasp hinge and can be opened part way, either forward or aft, and locked when partly opened. The Sampson post forward of this holds a bracket for bow light. The running side light boards are set near after end of cabin and are easily reached from cockpit. A hand rail runs along each side of cabin roof about 1 ft. from outside edge. Oak chocks are run along forward and after decks



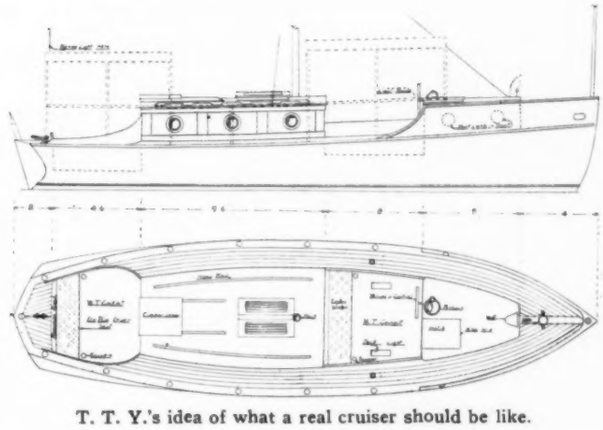
Bradford Edmands recommends the combination cabin type.



A suggestion for the day boat submitted by T. T. Y.



H. H. Parker taboos the companion slide.



T. T. Y.'s idea of what a real cruiser should be like.

of the bulkhead the house is of the "glass cabin" type with swing windows. This serves to relieve the monotony of a long raised deck with round ports, and also provides, without decreasing the standing headroom in the cabin, a narrow deck, which is often convenient when coming alongside a float. The cowl ventilators, swing hatch, ports and companionway give ample ventilation to the cabin.

A swivel davit is provided forward to facilitate getting the anchor aboard and to keep it clear of the white paint. A standing awning is shown over the cockpit, but this would be optional.

This arrangement of deck and cockpit combined with a judicious planning of the interior would seem to give the best accommodation for cruising in a boat of this size.

Bradford C. Edmands,
Newtown Center, Mass.

Some Original Features.

It would be hard to describe the best deck arangement for all cruisers, but the following I have found about the best suited to my own requirement. The cabin is half the length of the boat, then follows a 7 ft. cockpit and a 5 ft. after deck. The engine is is no cross seat at the stern, instead a square wooden grating is set in the space (4) between the seats. This allows good ventilation in conjunction with the hatch (4) forward. With no stern seat one can easily reach the Sampson post (S). A large scupper is set in each corner of watertight cockpit.

Deck is made of 1 in. square strips laid herring-bone fashion, as shown, and toe-nailed. When caulked it makes an extremely tight deck. This after deck is painted lead color; life is too short to fool with a varnished or holystoned deck.

The Sampson posts (S, S) are very substantially made; they are 4 in. x 4 in. oak extending through to keel, strongly fastened and with a ¾ in. brass pin 1 ft. long driven through to hold the lines.

No companion slide is used on cabin; they leak and are a nuisance in general and spoil a boat's appearance. The door on port side is about 2 ft. wide (boat has 8 ft. beam) and there is also a door on starboard side about a foot wide, enabling one to reach the switchboard batteries, etc., from cockpit. Steering wheel (W) is on cabin bulkhead in center. Just below it to port is the reverse clutch handle (R) and to starboard the sparks and throttle controls (C) a square section (Fig as shown, making a good foothold in rough water. Whistle is located on after end of cabin roof in reach of man at wheel. Stern light is attached to long pole set into two brass brackets on aft end of cockpit coaming. Pole stows in cabin transom locker when out of use. The square coaming gives more room in cockpit than the rounded one and is easier to fit.

No cockpit awning is shown, but, of course, could be easily attached if owner desired one.

H. H. Parker, Oakland, Cal.

Two Excellent Arrangements.

In determining the exterior arrangement, the use to which the boat is to be put will largely determine the final choice. It may be seen from the sketch that two of the most general types were chosen, a boat for extended cruising and a day cruiser.

The great majority have only a two weeks' vacation and Sundays to use their boats, therefore a full cabined craft does not satisfy the owner, who has to stay below in the cabin or crowd with his friends in a small cockpit.

A large cockpit is shown which, when pro-

vided with chairs, will accommodate a large party. The cockpit is the real living place, and should, therefore, be equipped with chairs, a table, electric lights, etc., so that a day's outing may really be enjoyed. Berths for two are provided in the cabin, while two or more may sleep in the cockpit, which is to be surrounded by curtains.

A toilet room, with shelves and large hanging lockers, under the forward deck, a small galley and icebox and stowage space under the after deck and cockpit, make short cruises a possibility and a pleasure.

The engine is located as shown, with the flywheel projecting into the cabin. The forward deck and cabin roof give plenty of space for lines, anchors, lights, etc. The cabin was carried to the edge of the covering board, to provide room inside, and, as this boat will not meet real heavy weather, it is safe to go forward over the cabin roof. The hatch in the after deck is highly desirable as it gives access to the space beneath, ventilates said space and also space under cockpit floor and allows access to the quadrant and wheel ropes. This type of boat has been tried out by the writer, and after a season's use has shown no defects in arrangement. The small details must be worked out to suit the owner.

The other boat is intended for extended cruising, accommodations having been provided for this purpose. Arrangement as follows: Two bunks forward, engine under bridge deck, galley, toilet and two extension berths in main cabin. On account of heavy weather likely to be met, the high raised deck forward was not chosen. The deck surrounded by a bulwark gives safety in handling anchors and lines. The trunk gives headroom between the berths. When in strange waters a clear view ahead is necessary, hence the bridge deck forward. The whole crew may obtain a fine view by sitting on the trunk cabins or bridge deck, while the cockpit in the stern provides a sheltered seat in bad weather. Although the cabin space is slightly less it is more than compensated for by the deck room and the stowage space under the decks.

In this as well as in the day boat all the small details will have to be worked out to suit the boat's shape and also the owner.

T. T. Y., Chicago, Ill.

Side Seats in Cockpit.

THE accompanying drawing shows a spacious arrangement of a raised deck cruiser 30 ft. over all by 8½ ft. beam. It is desirable to have a large, roomy cockpit, even though the size of the cabin must be reduced, for the cockpit is necessarily the lounging place in fair weather and also the sleeping place on warm nights.

The cabin, therefore, should be made as small as possible, allowing, however, enough length for proper size berths, galley, etc.

On a cruise many things in the way of provisions, etc., are necessary, and the cabin affords a poor stowing place for these. The space under the after deck can be made into a large, spacious locker, and will stow these things away very nicely. If the length of deck will permit, a sliding hatch will greatly facilitate stowing or removing things.

Fuel tanks can be placed under seats in cockpit and a folding table for charts, games and meals can be placed in the center and lashed up under awning when not in use.

The crowned deck of a raised-deck cruiser affords a rather dangerous footing in rough water and for this reason a pipe railing should be provided.

Harry A. Motz, Philadelphia, Pa.

Raised-Deck 30-Footer.

FOR a motor cruiser of 30 ft. over-all length the raised deck type affords advantages superior to any other style of construction. Combined with the best obtainable seagoing qualities and the maximum amount of dryness in bucking a head sea it also offers the best accommodations below to be had in a boat of this limited length. Full head room should not be expected in the cabin of a 30-footer, and can rarely be secured unless the craft is of the full glass cabin type, a type now happily, for the most part, confined to the quiet waters of rivers and lakes of moderate size.

The trunk cabin, while not objectionable, fails to give the unobstructed room of the raised deck, and has nothing to commend it over the later form of cabin. A head room of 5 feet to 5 feet 6 inches may be obtained in a raised deck 30-footer of moderate draught, and this is generally considered sufficient. The raised deck itself, while exposed and inhospitable in stormy weather, is a fine lounging place when seas are smooth and skies blue and is not difficult to work on, as has been sometimes claimed, unless the deck beams are crowned unreasonably.

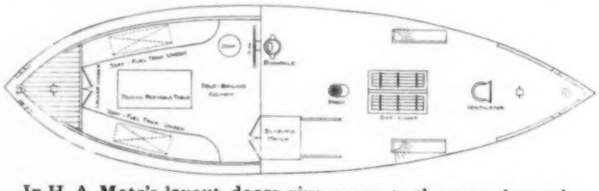
The raised deck portion of the boat may extend from the stem aft for perhaps a distance of 19 feet to the break which marks the location of the bulkhead between cabin and cockpit. A narrow bridge deck, perhaps 18 inches wide, will afford room for the reverse gear, with control handle beside the steering wheel, and will also make a good step for use in entering the companionway, which is on the starboard side. The cockpit side seats, 6 ft. 6 in. long, are located over the cylindrical gasoline tanks and are long enough and wide enough to sleep on when desired. The cockpit being self-bailing with a scupper at each corner makes this tank installation as safe as any that could be devised. A lazy-back across the after end of the cockpit makes a very comfortable seat for the ladies. The after deck, three feet in length, covers the steering quadrant and much valuable storage space. The steering wheel is amidships (as it always should be), with binnacle and compass forward of it on top of the wheel box.

Naturally this deck arrangement will not please everybody, but it provides for a separate toilet, a cabin large enough to afford good cruising accommodations and a roomy engine room with galley "on the side," all under the raised deck, and a cockpit capable of seating a fair-sized party comfortably when on day trips.

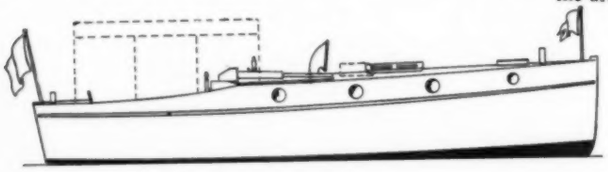
A. O. G., Portland, Me.

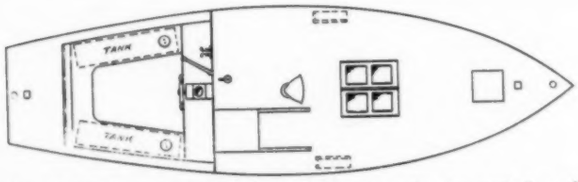
Steersman's Cockpit Forward.

THE accompanying drawings are of a 30 ft. cruiser especially designed for a party of four. In getting out this boat, the problem was to have an attractive looking outfit with a bridge deck forward. This was accomplished by lowering the bridge over the engine, and by doing this, the person steering can sit comfortably at the wheel and not give the boat a top-heavy appearance. There is a low weather board of wood capped in mahogany built around the bridge. This protects the helmsmen from any solid water that may come aboard. On the bridge is located binacles chart case and engine controls. This makes it very easy for one man to handle the boat. Forward is located a "Victor" capstan with chain and hawse pipes conveniently arranged. One 35-pound anchor is carried in the hawse pipe on the port side, while a 75-pound anchor is lashed to the deck on the starboard side. Just forward the bridge is located a large hatch, fitted with a large deadlight, leading down into the engine room. There is arranged a removable iron ladder which can be removed when starting the engine. Two 6-inch cowl ventilators are located on either side. These, with the hatch and seven port lights, make the engine room very well ventilated. There is a mast stepped just aft the bridge, fitted with a small arm and so arranged to carry a good spread of sail. There is a 6-inch cowl ventilator placed over the toilet. The main companion way is located on the starboard side, and leads into the saloon. The cockpit is watertight, and self drained, with a very comfortable transom seat at the after end. The cockpit will seat five persons using wicker chairs and the seat. The cushions in the cockpit and on the bridge are of green leather. A flush hatch is fitted in the cockpit floor, giving access below. All the outside woodwork is of mahogany finished bright. The forward deck is canvas covered, finished in navy buff. The covering boards on the main deck are of mahogany. The after deck and cockpit floor are of white pine finished bright. The hull above the water line is finished black and the underbody in light green, with a white boot top between. There is a gold stripe cut just below the fender guard. An awning is ar-

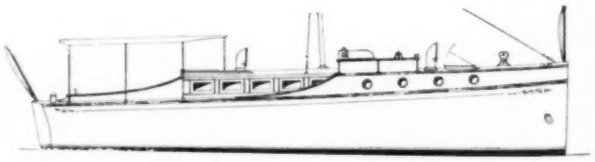


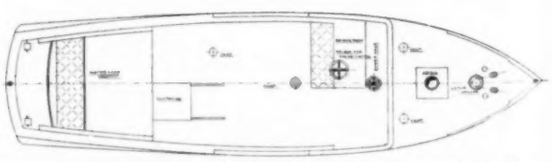
In H. A. Motz's layout, doors give access to the space beneath the after deck.





A. O. G.'s tanks are installed beneath the seats in the cockpit and drained into the latter, which is self bailing.





W. E. John provides a steersman's cockpit forward, besides the usual one aft.

ranged over the cockpit frame is of galvanized iron pipe and covered with canvas. The windows in the house and the port light forward are arranged to swing in. This makes the boat very cool in hot weather.

The principal dimensions of this boat are as follows: Length, over all, 30 ft.; beam, 8 ft.; draft, 3 ft.; headroom, under the carlins, 6 ft.

W. E. JOHN, Philadelphia, Pa.

Boat Building Woods.

The Characteristics of the Various Woods Used in the Construction of Motor Craft and the Parts for Which They Are Best Suited.

THE PRIZE CONTEST—Answers to the Second Question in the February Issue.

The Woods and Their Characteristics.

Prize Won—Michigan Steel Row Boat.

WOODS used for boats should be carefully selected from the best well-seasoned stock. Give due consideration to weight, strength, hardness, elasticity, workability, warpage, shrinkage, durability and price. The various woods and their characteristics are as follows:

WHITE OAK.

Very strong, hard, elastic, quite straight-grained, works easily for a hard wood, warps and shrinks little, very durable. 46 lbs. cu. ft. Price of plain, $70 to $100; quartered, $110 to $180. (All prices quoted are per thousand feet in the vicinity of New York City). Its more important uses are for entire backbone, ribs, beams, sheer streak and finish. Quartered oak for decorative trim, decks, etc., is very serviceable, beautiful, and takes a high polish.

WHITE CEDAR.

Not strong, soft, close-grained, compact, works very easily, shrinks and warps very little, extremely durable and light. 21 lbs. cu. ft. Price, $85. These qualities make cedar most desirable for planking, covered decks, roofs, etc.

CYPRESS.

Properties and uses similar to cedar, stronger, harder, more elastic, and comes in longer lengths. 30 lbs. cu. ft. Price, $70. Absorbs more moisture than cedar, therefore if allowed to dry planking opens more than cedar. Composed of hard and soft layers. The softer parts swell more, making planking rougher than cedar. Nevertheless cypress makes good planking, excellent flooring, and varnished or painted interior trim.

MAHOGANY.

Very strong, elastic and hard, close-grained, easy to work, warps and shrinks extremely little, holds glue better than any other wood, comes extremely wide and long. 35 to 53 lbs. cu. ft. Price, $150 to $250. These qualities, with beauty and susceptibility of high polish make mahogany very desirable for decorative finish, decks, bulkheads, transoms, etc. Expensive boats are planked with mahogany, which is especially suitable for double planking. The lighter Mexican and African woods are used more than the Cuban and St. Domingan. Redwood and Spanish cedar are substituted for mahogany on the Pacific Coast.

LONGLEAF GEORGIA PINE.

Very strong, hard, and most elastic, coarse-grained, hard to work due to soft and hard layers and pitch, warps and shrinks little, quite durable. 44 lbs. cu. ft. Price, $35 to $55. Excellent for clamps, stringers, keelson, flooring, inexpensive interior, and planking for large, heavy boats.

WHITE PINE.

Neither strong nor elastic, straight-grained, soft even texture, easiest wood to work, quite durable, affected by extreme changes of temperature, swells very little, takes a good finish, not prettily grained. 24 lbs. cu, ft. Price, $100 to $130. Valuable where lightness is desired. Good for interior finish, decks, floors, etc. Used, but inferior, for planking.

LESS COMMON WOODS.

Spruce is quite similar to and cheaper than white pine, tends to twist. Advised only where used in narrow strips as stringers, battens, floors, etc.; best wood for spars.

Rock elm is similar to oak, considerably used for ribs in smaller boats.

Hackmatack can be obtained in naturally bent pieces, therefore desirable for kness.

Whitewood is very good for painted interior.

Teak, cherry, maple, birch and ash are used for decorative purposes.

"When in doubt which wood is best,
Use white oak, it stands the test."

C. F. SMITH, New Brighton, N. Y.

Considered Piece by Piece.

FOLLOWING are two tables; the first giving the various parts of a motor boat with the wood or woods commonly employed in the construction of each part, placed in the order of general preference; the second giving the principal characteristics of the more common woods used and their points of advantage and disadvantage. It will be seen from the first table that while nearly every kind of wood known is used in motor boats, oak and pine are the standbys, as in the days of our forefathers. Many boats are constructed entirely of these two prime elements in shipbuilding, and even to-day we occasionally see a boat constructed wholly of oak.

TABLE ONE.

Apron	Oak.
Bilge stringers	Oak, yellow pine.
Bitts	Oak, mahogany.
Boarding steps	Oak, mahogany.
Breast hook	Oak.
Bulkheads	Oak, cedar, white pine, cypress, mahogany.
Butt blocks	Oak.
Carlins	Oak, elm, mahogany.
Ceiling	Cypress, white pine, yellow pine.
Clamps	Yellow pine, oak.
Coaming	Oak, quartered oak.
Companionway	Oak, mahogany, teak.
Covering board	Oak, teak.
Deadwood	Oak, spruce.
Deck	White pine, cypress, white cedar, oak, mahogany, cherry, walnut.
Deck beams	(See carlins).
Deck house	Teak, Honduras mahogany, African mahogany.
Dinghy	Cedar with oak stem.
Dowels	Locust (if of wood).
Engine bed	(See motor bed).
Flag poles	Spruce, ash.
Flooring	Cypress, white pine.
Floor timbers	Oak, elm, pine.
Frames	(See specific parts of).
Hand rail	Oak, mahogany, teak.
Hatches	Oak, mahogany, teak.
Horn timber	Oak.
Interior finishing	White pine (enameled white), cypress, teak, mahogany, birdseye maple, sandalwood, Flemish oak, Circassian walnut, rosewood.
Keel	Oak, yellow pine (with oak shoe).
Keel battens	Oak.
Keelson	Oak, yellow pine.
Lockers	Cypress, oak, pine.
Motor bed	Oak, hard pine.
Oars	Ash, spruce.
Planking	Cedar, cypress, white pine, leaf yellow pine, oak, mahogany, teak.
Plank sheer	Oak.
Plugs	Oak.
Ribs	Oak, rock elm, red elm.
Risings	Oak, spruce, elm.
Roofing	Cypress, pine, oak.
Rub strake	Oak.
Rudder (if wood)	Oak.
Rudder stock	Oak.
Seats	Pine, cypress, oak, white ash, mahogany, butternut.
Seat knees	Oak.
Shaft log (if wood)	Oak.
Sheer strake	Oak, cypress.
Signal mast	Spruce.
Skeg (if wood)	Oak, elm.
Skylights	Oak, mahogany, teak.
Stanchions (if wood)	Cypress, oak.
Stem	Oak, hackmatack.
Stern knee	(See transom knee).
Stern post	Oak.
Transom	Oak.
Transom knees	Oak, hackmatack, chestnut.
Truck (pulleys)	Lignum vitæ.
Tiller	Oak, pine, ash.

TABLE TWO.

Material.	*Advantages.*	*Disadvantages.*
Oak.	Very strong and hard. Usually straight grained. Hangs on to fastenings hard. Not liable to split in strain.	Heavy.
Yellow pine.	Has much longitudinal stiffness. Can be procured in long lengths. Resists absorption of water.	Not as tenacious as oak.
Cedar.	Tough, fibrous, light. Resists absorption of water.	Hard to get in long lengths.
Cypress.	Tough. Cheaper than cedar.	Does not resist absorption of water so well. Hard to finish smooth.
White pine.	Light. Not apt to rot. Keeps tight well.	Not as strong as cedar. Rather expensive.
Spruce.	Straight, tough.	Splits easily. Rots quickly under water. Knotty.
Mahogany.	Soft, easy cutting. Beautiful finish. Refinishes well.	Expensive.
Teak.	Strongest, toughest, most lasting wood known.	Expensive.

BRADFORD BURNHAM, New York City.

Small Boat Timber.

THE small boat may be conveniently divided into five portions: backbone (keel, stem, stern post and keelson), ribs, planking, decking and cabin.

The following data gives such characteristics as are concerned in boat work. The weights are for average lumber in pounds per cubic foot.

White oak: 54 lbs. Tough, strong, easily bent, not easily split, holds fastenings well, very durable under all conditions, scarce in length over 14 ft., hard to work, swells and shrinks considerably.

Georgia pine: 42 lbs. Very stiff, strong, durable under all conditions, obtainable 40 to 50 ft. long, swells and shrinks little, not easily bent, fairly easily split, hard to work.

Teak: 55 lbs. Tough, strong, extremely durable, swells and shrinks little, preserves fastenings from rust, fairly easy to work, splits somewhat easily, very expensive.

Hackmatack, 35 lbs.; and locust, 45 lbs.: Crooks easily, easily obtainable wherein the grain follows the desired curve, durable in damp places.

Elm: 38 lbs. Very strong, tough, durable, readily bent, holds fastenings well, not easily split, sap portion as durable as heart.

White cedar: 35 lbs. Durable, wet or dry, soft, easily worked, seldom obtainable, clear, over 14 ft., easily split, swells and shrinks freely, comparatively weak, absorbs water considerably, not easily bent.

Cypress: 28 lbs. Obtainable clear, long and wide, soft, easily worked, durable under water, subject to dry rot, rots if alternately wet and dry, weak, not easily bent, absorbs water freely, swells and shrinks freely.

White pine: 35 lbs. Durable under all conditions, soft, easily worked, somewhat weak, splits easily, swells and shrinks freely, not easily bent.

Spanish cedar (unrelated to white cedar): 33 lbs. Obtainable clear in moderately long lengths, soft, easily worked, durable if cared for, splits easily, rather weak, not easily bent.

Mahogany: 35 lbs. Obtainable long and clear, fairly easily worked, camparatively tough and strong, swells and shrinks little, very durable dry, decays when wet if not cared for.

Chestnut: 43 lbs. Obtainable long and clear, easily worked, very durable under exposure to weather, easily split, not easily bent.

Red oak: 42 lbs. Obtainable fairly long, strong, easily bent, easily worked, swells and shrinks greatly, subject to dry rot, rots quickly with alternative wetting and drying.

RECOMMENDATIONS.

Backbone—White oak, Georgia pine.

Ribs—White oak, elm.

Planking—White cedar, Georgia pine, cypress, white pine.

Decking—White cedar, Georgia pine, white pine, cypress, chestnut, any of the oaks, mahogany.

Cabin, Outside—Same as decking.

Cabin, Inside—If painted, white cedar, Georgia pine, white pine, cypress; if finished bright, any of the oaks, Georgia pine, chestnut, mahogany, cherry, butternut, or any other fancy wood to suit owner's taste.

Harrington Barker, Washington, D. C.

Cost a Big Factor.

In discussing the woods for building a boat the proposed cost and use to which the completed craft is to be put will have an important bearing upon their selection, particularly in the finish, which may be as elaborate as one's purse will allow.

The frame, consisting of keel, keelson, stem, stern post, ribs, etc., should be constructed of oak in every case because of its strength.

The planking may be of either mahogany, cedar or white pine, the cost and use entering largely into the selection. The mahogany is the most expensive and takes a high polish and gives an elaborate and very yachty finish. Cedar is a good planking, combining, as it does fairly well, the qualities of lightness and strength, and also it does not shrink and swell to any great extent when taken out and put into the water. Good second growth white pine also makes a good planking and is cheaper than either of the others. It will open up more when the craft is hauled out for the winter but will generally close up inside of 24 hours after being put overboard. Second growth pine should always be used as the old growth pine is invariably very brittle.

If the decks are to be left uncovered mahogany or oak cut in narrow strips and sprung to the shear will take a fine finish for a fancy craft and white pine or cypress may be used on a working or fishing boat. If the decks are to be covered with canvas the cheaper wood will be the one to use.

In the interior woodwork and finish the individual taste and purse of the owner and the use to which the boat is to be put will determine what is to be used. Of course, mahogany is the ideal yacht finish, but many other hard woods make very handsome interiors and, as said before, this is largely a matter of taste and use.

F. M. Comee, Cambridge, Mass.

Teak Best All-Round Wood.

In boat building it is important to use a wood that is best adapted to the purpose. The keel and frames of a boat require a wood that is tough, strong and durable. The kind of planking varies with the kind of boat to be built. A speed boat requires planking that will be of light weight and strong, while in a heavy cruiser, weight is not of such importance as strength and durability. The interior finish of a boat is mostly a matter of taste.

The principal woods used, with their general character, follow:

Teak is the best possible wood for use in boat building. It is imported from the East Indies. The timber is dark brown in color, very hard, strong and durable, does not crack, warp, shrink or soak up water, and does not corrode iron. It resembles mahogany and is more durable and much lighter than oak. It is largely used in Europe for framing and planking and is being used quite extensively in this country.

Mahogany is much used for planking, exterior and interior finish. The mahogany generally used is a hard, fine-grained, reddish-brown wood resembling Spanish cedar. It is easy cutting, with a grain that goes apparently all ways at once. There are several varieties used for interior finish, which take a high polish.

Long leaf yellow pine is hard, strong, compact, resinous wood, and is used in place of oak for boats of heavy construction. It can be easily procured in long lengths and good widths. It is straight-grained, without knots, has great strength, resists water, finishes very smooth, and makes good and durable planking.

White Pine is a whitish wood, light, soft, straight-grained and easily worked. It is almost as strong as cedar, is not apt to rot or check and makes good planking. It is getting quite expensive, owing to its scarcity and the great demand for other purposes.

White Cedar is a light, tough, fibrous wood, easy to work, and finishes up smooth with little labor. As planking, it is the most popular for use in craft up to 40 feet in length. It can be procured in lengths up to 24 feet.

Washington Cedar from the West Coast makes good planking. It comes in long lengths, is light, will not soak up water, and does not shrink or swell.

Cypress makes fairly good planking and is much used owing to its low cost, compared with other woods. It comes in long lengths and can be procured in very wide boards. It is a long, fibrous grained, tough wood that lasts well, but is apt to soak up water. Some boards are very light in color and others very dark, with a pretty grain that causes it to be used for cheap panel work. There is one difficulty with it, it is almost impossible to finish it off perfectly smooth, the grain rising up the moment the varnish touches it.

White Oak is a light colored, very tough, elastic and durable wood. It can be procured in good lengths and widths and is much used for keels and framing. It shrinks and swells to some extent and checks badly when exposed to the weather. When quarter sawed, white oak has a beautiful grain, and in this state is largely used for interior finishing.

Rock Elm is tough and stringy and valued for its durability under water and is used for framing.

Black Cherry is used for an interior finish, takes a high polish, the polished wood, a rich lustrous brown, rivaling mahogany and rosewood.

John Clitheroe, Attleboro, Mass.

Some Woods Becoming Scarce.

The selection of the proper kind of wood for each part of the boat's anatomy depends upon the type, size and cost of the ship itself. The determining factors of to-day are far different from those of a few years ago, due to the extreme scarcity of some kinds of timber, and, without doubt, sometime in the future metal scantlings will be used to a large extent even in the smaller craft.

Where weight and cost are of little consideration the answer is easy, for there are no more suitable or durable woods known in the shipbuilding art than oak and teak for the entire construction from the keel to the skylight. However, as weight and cost can seldom be eliminated from actual practice, several alternatives must be considered.

Oak, seasoned by keeping in the water from the time the timber is cut until shortly before it is used, and then dried out slowly, should invariably be used for the keel, frames, dead wood, stem, deck beams and engine bed, regardless of the type of the boat. The only exception to this is when the size of the hull is such that one-piece lengths of oak cannot be obtained, in which case hard pine may be substituted with almost equally good results. For the planking: teak, mahogany, cedar, hard and soft pine and cypress each have their good features.

The most durable is oak, which is very desirable for the garboard and top strake in cruisers, especially that with the fine grain which is the toughest. Teak is the most suitable for the rest of the planking and, in fact, for all of the fittings, but on account of its extreme weight and cost it is generally eliminated. Mahogany, although expensive, is fairly light, hard, durable and free from knots and makes excellent planking, the light colored mahogany being the best. Hard yellow pine is very tough and good for planking, either above or below the water line in working boats, which are subjected to hard usage. It is one of the cheaper woods and can be obtained in long lengths, but is rather hard to work and likely to contain bad knots. It is the most susceptible wood to changes in climate and weather conditions.

Cedar is probably the best all-around wood for planking motor boats. It is light, fairly tough and durable for its weight but is likely to split easily and absorbs much water if not dried out often. Cypress is the least desirable of the woods suitable for planking. It absorbs quantities of water and cannot be finished down smooth, but is cheap in price and lasts fairly well. White pine is excellent for planking as it can be easily worked, but its cost, short lengths and small knots are the causes for it being seldom used these days.

For the deck: mahogany in the lighter craft and yellow or white pine in the larger give the best results. For interiors and trim, mahogany and teak are again the best, but the grain in cypress gives it possibilities for excellent, cheaper work. For floors, white or yellow pine are almost universally used.

Spruce is seldom used except for spars, and ash or elm are sometimes substituted for oak but are not as suitable. Elm is likely to rot and warp where it is alternately wet and dry.

A. Armstrong, Norwich, Conn.

Re-Finishing "Bright Work."

Instructions for Putting the Varnished Parts of the Boat in Shape for the Coming Season. Removal of the Old Varnish, Treatment of the Wood, Etcetera.

THE PRIZE CONTEST—Answers to the Third Question in the February Issue.

A Successful Method.

Prize Won—Five Pyrene Fire Extinguishers.

ANY of the "removers" advertised in this magazine will save time in restoring interior finish of a boat. Apply the liquid kind to the varnished surface and, after a minute or so, the coating will be softened and it may readily be peeled off with a putty knife. Be careful not to gouge the wood; it is wise to have corners of the knife slightly rounded so that a slip will not result in disfiguring the wood.

When the surface has been roughly cleaned with the remover and knife go over it again with steel cabinet scrapers, the kind that look as if they had been made out of saw blades. Should moulding or panels invite your skill it is well to file narrow scrapers to fit. Then proceed with caution and don't let the scraper slip. Unsightly scratches will surely be penalty for haste.

When the scrapers get dull touch them up with a file or whetstone, sharpening the metal square across. Turn the edges slightly with a smooth piece of steel, the shank of a bit will do nicely, because it is the burr or wire edge that makes the cutting progress. The skilled artisan is able to fix up a scraper, as described, so it will take off a shaving like a smooth plane or simply dust the work.

Follow the scraper with medium sandpaper and go over it again with fine sandpaper, getting into all corners with the point of a skewer such as butchers use. That operation cleans out the dirt that would give the finished job a streaked appearance. Should the wood be discolored bleach it with a solution of oxalic acid, five cents worth at the drug store ought to do the trick in a large boat. After letting the solution penetrate the wood for a few hours wash it off and follow with strong white vinegar to neutralize the oxalic acid's destructive properties. Now sand the roughed grain.

Oil stains may be applied to the wood if the cleaning process has altered the tone of the interior. Apply the stain with a brush—the light stains will give better satisfaction as more coats may be used to darken the work, and let it remain several hours after wiping thoroughly with a handful of cheese cloth. The wiping must not be overlooked as it brings out the grain which, otherwise, would be muddy. Follow with a filler recommended by good paint makers.

The interior should now be ready for refinishing and the treatment advocated by boat decorators varies. Some use alcohol-thinned shellac, the white kind for first coat, claiming it will make scraping easier as the varnish that comes later cannot penetrate the wood. Anyhow, rub the first coat, whether shellac or varnish, with fine sandpaper or pumice and water, having allowed plenty of time for the coat to get hard. Some varnishes may be rubbed in 10 hours while other brands must be left alone a day, or longer. Three coats of varnish ought to give plenty of body. If a glossy effect is desired flow on the final coat of varnish. Dull, or egg-shell, finish is had by rubbing with pumice and water.

Use a good quality of varnish on interiors and for open boats nothing is so durable as "spar," which should prevent mottling in rainy weather. Careful finishers will not varnish in damp weather and, if the cabin is cold, the varnish is warmed before being applied. These men, also, will not varnish during an easterly "spell" unless a rush job is imperative, owing to presence of excessive moisture in the atmosphere. They like a brisk northwester and open up everything to the air.

Much of the success in refinishing depends on the shape and quality of brushes. Don't use any old brush, perhaps those that have been in paint, but get the kind recommended by the stores as best for the purpose. Sometimes it is necessary to thin varnish but the amateur would best go light with the turpentine and apply the varnish as it comes from the can. It may be made more easily worked by warming, which does not harm the body, so essential to a satisfactory job.

WINCHESTER, Boston, Mass.

Several Conditions Considered.

SPECIFICATIONS No. 1.—If the woodwork or varnished parts are in fairly good condition, wash down with soap and water to clean the dirt and grease from varnished parts. If you find spots that are hard to clean off use pumice-stone and water; rinse well with water. When perfectly dry sandpaper well with Nos. 1 or 2 sandpaper. Dust off and apply one or two coats of varnish, using a good grade of outside spar or marine varnish, of which there are a number of good makes on the market. If two coats are required to put the wood in good condition allow a space of three or four days between first and second coat to give satisfactory results. Sandpaper lightly between coats with fine sandpaper.

Specifications No. 2.—Where the varnished parts are perished from exposure to the weather so that sandpapering will not make a smooth surface scrape dry with steel scrapers filed in different shapes to properly clean the flat surfaces and mouldings. This is a tedious job for the amateur. If you find you cannot make a satisfactory job scraping dry try one of the varnish removers that is on the market. They are good for this class of work. Apply a coat to the parts and proceed to scrape. Apply a second or third if necessary to clean all varnish from woodwork. After varnish is removed rinse well with benzine or gasoline to kill the alkali; sandpaper well with Nos. 1 or 2 sandpaper, finishing with No. 1. Dust woodwork and apply one or two coats of a good grade of spar or marine varnish, allowing from three to four days between coats, and sandpaper lightly each coat with No. 1 sandpaper.

Specifications No. 3.—Where the woodwork is stained and varnished parts are in bad condition from exposure to the weather, proceed to scrape dry or use varnish remover, finishing with benzine or gasoline, and sandpaper, as in specifications No. 2. After varnish is all removed from woodwork and sandpapered apply a solution of oxalic acid and water made quite strong—one part to three parts water dissolved in a glass jar—this is a bleach to take hold of the dark and stained spots. If it is applied two or three times, letting it stand awhile, you can make the woodwork look quite clean.

After the woodwork has been treated, as above, take a stiff whiskbroom and brush the parts well. Then apply vinegar with a cloth free from lint to kill the alkali. When perfectly dry sandpaper with No. 1 sandpaper. Now take raw oil and turpentine, equal parts, with a little dryer, adding a little raw sienna to make light oak stain or raw sienna and burnt umber for dark oak. If the woodwork is mahogany color with burnt sienna and a little burnt umber. Apply with a brush to woodwork then take cloth free from lint and wipe dry letting it stand a day or two. Putty up nail-holes and cracks with putty colored to match woodwork; apply one, two or three coats of best spar or marine varnish allowing three or four days between coats to dry hard; sandpaper lightly between coats. To make a first-class job, after standing three or four days, rub down with pumice-stone and water. All open grain new woodwork should be filled with paste filler colored to suit, thinning with turpentine to the consistency of cream; apply with a brush and clean off with burlap, and when dry putty and apply the varnish as above.

Avoid using shellac or liquid filler on outside woodwork. If boat owners would wash the varnished parts clean and apply with a cloth or waste raw oil and turpentine, equal parts, rubbing on and well rubbed off with waste or cloth, two or three times during the season the varnish would last a long time and look bright.

WILLIAM A. CRAWFORD,
Hudson, New York.

Recommends Steel Wool and Washing Powder.

IF the varnish is in good condition and the wood not exposed, purchase at any paint store some "Savogran" (a washing powder used by painters) and fine steel wool. Dissolve the "Savogran" in warm water and with the wool scrub the surface thoroughly. This wil remove all grease and dirt. Rub down with fine sandpaper and give it two coats of spar varnish.

If the varnish is in bad condition remove it and refinish as follows: Purchase at a hardware store some good scrapers, or if you prefer make them yourself. Good flat scrapers can be made from pieces of an old saw, with the edges beveled. An old flat file about an inch wide, with the end turned over at right angles and then beveled, makes a fine scraper on oak rails, deck, etc. Any blacksmith will make one for you.

At a paint store purchase some good varnish remover and a steel wire brush. Apply the remover according to directions on can and as soon as varnish is soft remove it with the scraper or wire brush.

Keep a good sharp edge on your scraper by using either a burnisher or file. Be careful always to work with the grain so as not to roughen it.

The brush should be used on mouldings, around panels and places where a scraper will not touch—it sometimes works well on flat surfaces. With a little time and patience you can get the wood in as good condition as when new. When you have the surface perfectly clean go over it with a solution of oxalic acid to remove weather stains, etc. Sandpaper carefully and you are then ready to refinish.

If you wish to stain some of the wood use only a good oil stain (do not use a varnish stain), rubbing it on with a rag; allow it to set about five minutes then rub off with a clean rag. When surface is dry proceed to vanish.

Avoid shellac and other fillers as you will get a much better wearing finish by giving the wood three coats of best spar varnish, allowing the first coat to act as filler. Rub down with fine sandpaper between coats, and after the first one is dry putty all cracks with white lead putty colored to match finish..

If any of your wood is very open grain and you wish to use a filller, use only one recommended by the makers of the varnish you use. A mixture of two-thirds linseed oil and one-third turpentine rubbed over oak rails, etc., gives it fine color and wearing finish.

H., Boston, Mass.

Uses Home-Made "Remover."

IN refinishing the varnished work on a boat a good varnish remover is the first requirement and the following formula is a good one:

Wood alcohol.....1 qt. 1 gill.
Gasoline.....1 pt.
Paraffine wax.....3½ ozs.

To mix the solution melt the paraffine and pour it into the gasoline. This mixture is then added to the wood alcohol and the whole shaken up well. If a few flakes of paraffine remain undissolved it does not matter. The proportions given should be adhered to quite closely. The paraffine wax may be obtained in most drug stores or ordinary paraffine candles may be used. Wood alcohol must be used and no other will do.

To use this solution simply swab it over a small space at a time with a brush and allow to remain three to five minutes, or as long as it will without drying, when the varnish may be scraped off. Spar varnish is especially hard to remove and more than one application may be necessary. Owing to the volatile nature of the solution the work should be shielded from the wind as much as possible in outdoor work.

The scraping is accomplished best with a cabinet scraper provided with a round piece of wood on top for bearing down with one hand and a handle for drawing along with the other hand. These scrapers may be obtained in the market or may be made from an old saw blade. The cutting edge consists of a burr curled over on the edge which will cut the hardest wood with ease. It is made by filing the edge square and then running a hard piece of steel diagonally across the edge of the scraper at right angles to the face. An old file ground smooth works very well for this purpose.

When scraping be careful not to dig into the wood with the corners. It is difficult to work close into corners and in such cases if there is a quarter-round remove it and clean it separately. The half-round guard is scraped best with a scraper having the same profile.

If it is desired to bleach the wood after removing the varnish a mixture of 2 ozs. oxalic acid and ½ lb. chloride of lime dissolved in 1 gal. of boiling water gives fairly good results. In any case sandpaper the wood and then wash off with gasoline, which removes the fine sawdust and gives a perfectly smooth job when the varnish is applied. This is a good practice every time the work is sandpapered.

Next either shellac the wood or fill with a paste filler brushing it across the grain; allow it to remain for a short while and then rub off with shavings or excelsior. The best fillers for boat work are known as silex fillers and consist of silex mixed with oil and a little japan dryer thinned with turpentine as desired. This may be colored with a stain to give the wood the desired color. Shellac works very well in place of the filler and not only gives the wood an excellent color but it dries very quickly, thus protecting the wood from dew or rain in case the work must be left unprotected over night or until the following Sabbath. This is especially important in the case of oak as it turns black very quickly with water.

Having filled or shellaced the wood rub it down with sandpaper and apply three or four coats of good spar varnish for outside and two coats for inside work, each coat being well brushed out, allowed to dry thoroughly and the gloss removed before applying the next.

It is poor economy to use only one or two coats of varnish on outside work as one or two extra coats applied in the beginning last a proportionately longer time.

F. H. Maloney, New Haven, Conn.

To Use a "Remover."

FOR refinishing the bright work of a boat, the first thing to do is to remove the old varnish and this is best accomplished by using a prepared chemical paint and varnish "remover," which can be obtained at any paint store. Apply the "remover" with a brush, as per directions, and the varnish will soon soften so it can be scraped off with a putty knife or scraper.

Ammonia and sometimes potash lye are used and, while they are cheaper, they do not do the work so well.

After the varnish is all scraped off wash the work well to clean off any "remover" or varnish that may remain. Now, after the wood has dried, sandpaper or rub with "steel wool." Next, if the wood has become stained, bleach with a solution of oxalic acid—about one pound dissolved in a gallon of hot water. Apply with a swab from time to time until the dark places have become like the rest of the wood. Now wash off the acid with clean water and let the work dry, then sandpaper lightly to smooth the wood where the water may have lifted the grain. Next dust the work off and apply a coat of paste filler to oak, or similar porous woods. Never use a so-called liquid filler as they are unsuited to marine work. The paste filler comes in the form of a thick putty and should be thinned with turpentine, as per directions, and applied with a brush; after a few minutes it will dry "flat" and then should be rubbed off with clean rags. Apply only so much at once as you can rub off before it becomes too hard. Now, after allowing one day for the filler to thoroughly dry, you are ready to varnish same as new work. Use only the best spar varnish and apply two or three thin coats, allowing plenty of time for drying between each.

If the old varnish is in fair condition and you wish to revarnish without removing it, you can bleach out the bare spots with the acid solution, as above, then touch up the bare places with varnish and finally one or two coats over the whole surface.

Before revarnishing the old surface should be well washed to remove dirt or marks that would show through the next coat. If the boat is wiped off with a chamois-skin the surface can be made perfectly dry so varnishing can proceed at once.

C. H. C., Saginaw, Mich.

Troubles on the Water.

By A. D. Hard.

WHILE motors are now in such a perfect state of development that unreliable action is the exception where once it was the rule, there are still troublesome incidents to bother the expert occasionally, and the amateur quite frequently.

The motor boatman of a mechanical turn of mind will usually solve his trouble problems in some ingenious way and be able to proceed on his trip with but slight delay, but now and then difficulties which seem almost insurmountable retard a boating party for many hours after the time set for their return, with consequent worry of mind and sad forebodings for "the loved ones at home."

The following incidents are typical: A feed pipe leading from the gasoline tank to the motor became loose, and in a few minutes the gasoline supply was beautifully mixed with the bilge water in the bottom of the boat. We were ten miles from home, and it was almost dark. The water was rough and the constant motion of the boat prevented the gasoline from assuming its natural position on top of the bilge water, so we dipped up a liberal supply of the mixture and requested one of the ladies to hold it steadily poised while I skimmed off a portion of the gasoline. Emptying the lubricating oil out of the oiler can I filled it with the gasoline, and bending the broken end of the feed pipe upward I inserted the point of the spout into it. Of course we had to refill the oil can several times before we reached home, but we did not lose much time. * * * * *

It was raining and the motor stopped. I soon found that the cause of its refusal to work was "no spark" in the spark plug. But why? The dry cells were fresh and each one tested up all right with the ampere meter. After going through the complete list of what I considered possible causes, I casually noticed that the pasteboard covers of the dry cells were all wet. Removing them I wrapped each cell in dry cloth and protected them from rain. This ended the trouble. The wet paper had practically united all the zinc elements of the five cells into one. * * * * *

Out in the middle of the lake, three miles from shore, the boat gradually slowed down, although the motor continued to run. The set-screw which held the propeller to the shaft had worked loose and disappeared in the lake. Fortunately the propeller remained on the shaft. Not a single thing in the boat could be used as a substitute for that recreant set-screw.

Putting on the life preserver I dropped into the water at the stern of the boat, and bidding the others sit in the bow so as to elevate the propeller as much as possible I drove the small blade of my pocket-knife between the propeller and its shaft with the monkey-wrench until it broke off close to the handle. This served as a key which held the propeller while we traveled the three miles slowly, fearing all the while that our temporary key would let go, but it held solid. * * * * *

Our little one-cylinder motor began to miss explosions and within the next hour the misses had become so frequent that an investigation of the cause was required. Like some other foolish people who run motor boats I had neglected to supply myself with an extra set of dry cells. The cells showed less than three amperes of current, and there was no sense in blaming the engine for refusing to work properly. With my pocket-knife I dug holes in the asphaltum with which the dry cells are sealed and making a salt-water solution with the salt from our lunch-box I poured a little in each cell. The engine worked some better but did not do its duty as though it was perfectly satisfied, so I took out the spark plug and closed the spark gap until it would barely permit the passage of a thin card between the contact points. The result was all that could be desired. * * * * *

We ran out of lubricating oil about the end of our day's run and the knocking of the hot piston told me that it would soon stick fast if something was not soon done. The only grease on the boat was some butter and uncooked bacon left from our dinner. I first put a small lump of butter through the spark plug hole into the hot cylinder, and the engine ran for a short time, but did not seem to like butter. I then placed a strip of bacon about three inches long in the cylinder, and we had no further trouble going home.

When we got ready to start home from the anchorage where we had been busy all the afternoon catching croppies we could not raise the anchor; it was fast. After pulling and jerking for half an hour we tied the anchor rope to the stern of the boat and ran slowly until it pulled taut, then turning the boat we made a complete circle, pointing the bow so that there was a steady pull on the anchor rope. After making two circles we lifted the anchor with but little difficulty and made for home.

NEW MOTOR BOAT DESIGNS

"Kathaga," a New Type.

BUILDING by the Matthews Boat Company, of Port Clinton, Ohio, for Howard W. Baker, manager of the Butler stores in the West, is the unusual craft shown upon the following page. Her general dimensions are as follows: Length over all, 82 feet; beam, 14 feet; draft, 30 inches.

This boat illustrates one of the most peculiar and exacting conditions that could be put up to a designer and builder. Inasmuch as Mr. Baker requires a boat having the outboard appearance of an ocean-going cruiser, and the draft requirements for service on the upper Mississippi, it means a weight of practically 90,000 pounds carried on a draft of 30 inches. Special precautions, of course, must be taken in special construction to provide for the flat sections and tunnel construction over the propeller wheels.

A feature that has probably never been attempted before, is the combination of the tunnel stern with the steamboat type above the water line. This brought out many features in the design where no precedent could be followed. The builders, however, have very successfully met this condition, and the boat will have a pleasing appearance of outline above the water with no apparent indication of her shoal draft construction.

The photographs below will illustrate in a measure the general framing of the vessel and give an idea as to her form and construction. Above the water line she conforms very much in appearance to Mahapa II and Ethel M. Ward, built by the Matthews Boat Company, allowing a great deal of outside deck room together with most comfortable living accommodations.

By referring to the plan, it will be observed that the crew are accommodated under the forward deck, there being a separate stateroom for the captain, and in the crew's quarters are ample locker accommodations for their use.

The gasoline tanks are enclosed between steel water-tight bulkheads, and have a capacity of 600 gallons. These tanks fill from the deck, and every precaution known for safe installation has been used. The motors are installed ahead of amidship in a motor room that is entirely steel lined, there being steel doors at either end of the room, made as near water-tight as practical. Immediately aft of the motor room is located the galley, with swinging door between. The galley is fitted with a large icebox, dish-racks, sink, general lockers and a 6-hole coal range. Ventilation is provided by windows and ports, and a stack directly overhead. A special hood is built over the stove to take away all odors and heat, and a smokestack also is cared for in the main stack of boat.

A general toilet is installed just aft of the galley, with doors opening into a passageway and a guests' stateroom on the starboard side. The stateroom on the starboard side is arranged with a large double bed, dresser, seat and wardrobe, with a door opening into the main cabin. The cabin or dining saloon is arranged with seats about the starboard side, the balance of the space being suited for the use of chairs. A hinging berth with lockers at either end is installed on the port side, while on the starboard side are two sleeping lengths. An ornamental buffet is located on the aft bulkhead on the portside. Steps to the deck are provided at the starboard side aft. This makes a very comfortable cabin, practically 15 feet in length with a mean width of 9 feet.

The owner's toilet and bath are installed on the port side and are fitted with tiled walls. The owner's stateroom extends the full width of the boat, and is arranged with table, bed, dresser, lockers, wardrobe and seat.

In addition to these quarters is the large deck house which can be used as a general assembly or smoking room, and fitted with a second steering wheel at the forward end. This compartment is also arranged for sleeping accommodations. The cabin house is 16 feet in length, and the mean width is 9 feet, with entrance on the starboard side direct to the bridge. Motor signals and telegraph are installed alongside the steering wheel.

The exterior of the boat is finished in African mahogany throughout and the decks are laid in white pine, double thickness, with painted canvas between. The pilot house, as well as the main cabin and owner's stateroom, is finished throughout in mahogany, with paneled ceilings. The guests' stateroom is finished in cream enamel with mahogany trim. The toilet rooms are finished in white enamel with tiling about the sides, and the crew's quarters are painted throughout.

The boat carries two tenders, a 20-foot power tender, and a 12-foot rowing tender built with cedar lap strake planking, and mahogany and teak trim.

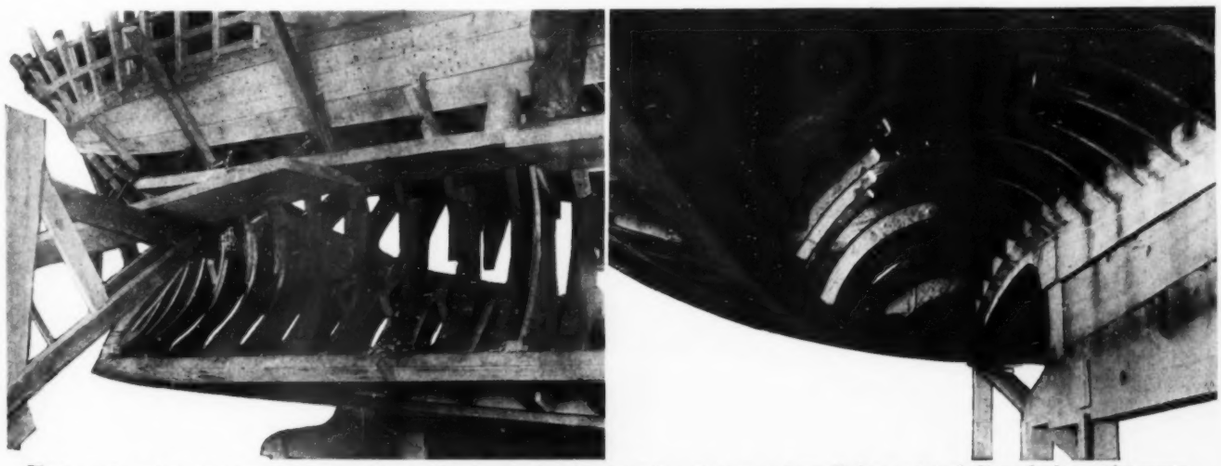
The power plant consists of two 60 h.p. heavy-duty Sterling motors, arranged with deck controls at the bridge location. The motors are fitted throughout for salt water service, and an independent Fay & Bowen electric plant of 110-volt 4 k.w. capacity is installed in the motor room. Special bronze fixtures are used throughout, and all wiring is carried through conduits. Electric sailing lights, canopy fixtures and fans throughout the boat are also provided. A 12-inch 3,000 c.p. searchlight is installed over the pilot house.

In making up the equipment every feature that could possibly be used on such a boat is provided for in the original contract, the upholstery and metal work being built at the Matthews plant. A wireless telegraph system is to be installed, which will keep the owner in communication with his office at all times. Another interesting feature that is brought out in the equipment is an inter-communicating telephone system of six stations. Push buttons are installed in the different cabins and on deck, with an annunciator in the galley showing twelve stations, so that the owner or guest is always in communication with the steward.

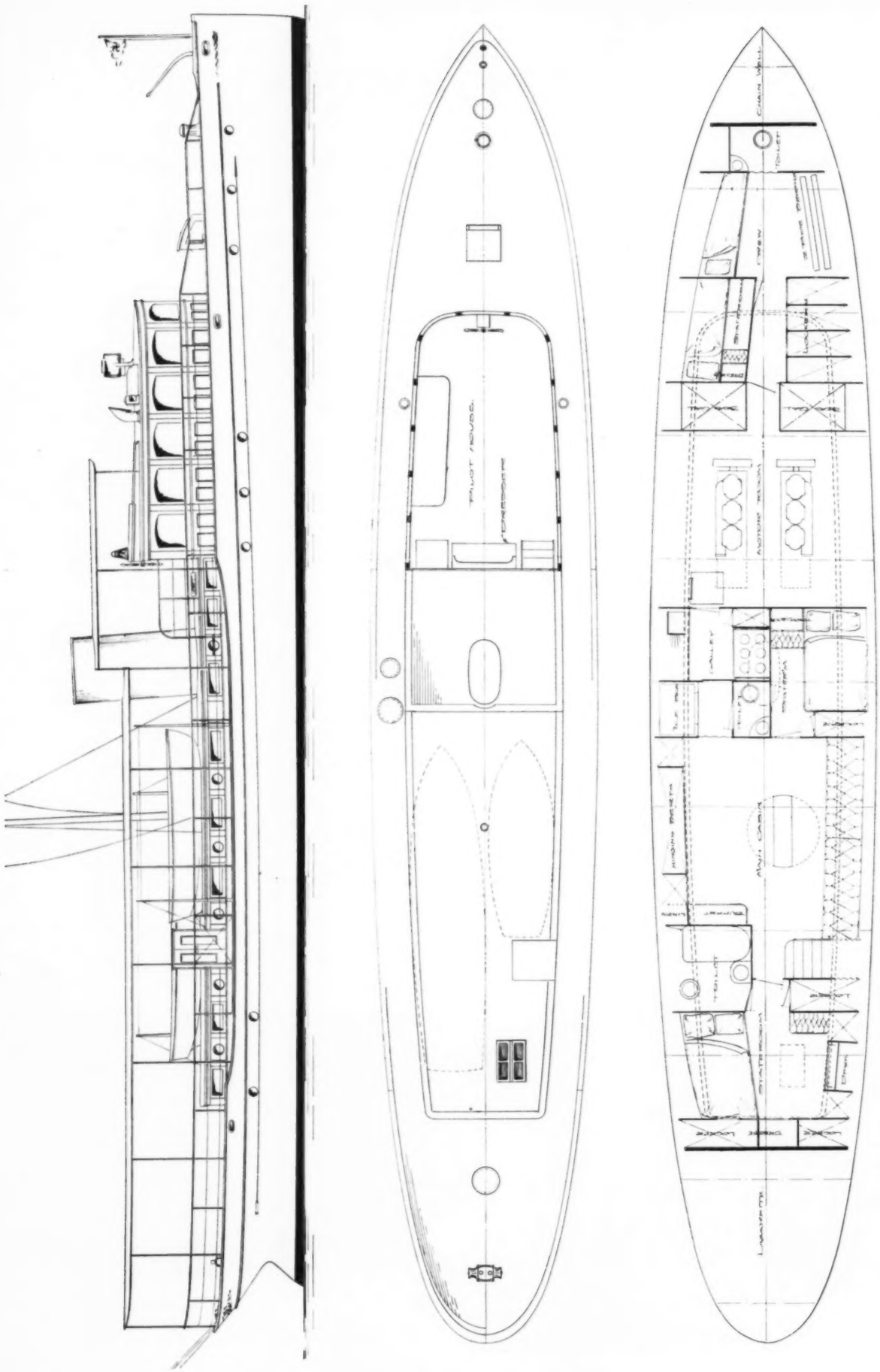
The boat is fitted with a hot water heating plant and the finest quality of upholstery. Special spring base velour cushions are used throughout, with Wilton carpets and special draperies.

A speed of 14 miles per hour is guaranteed, and the boat is to be delivered under her own power in Chicago on May 15th, where the owner will take charge and run her to St. Paul, her home port. The boat will be used in cruising on the Mississippi River and in Florida waters.

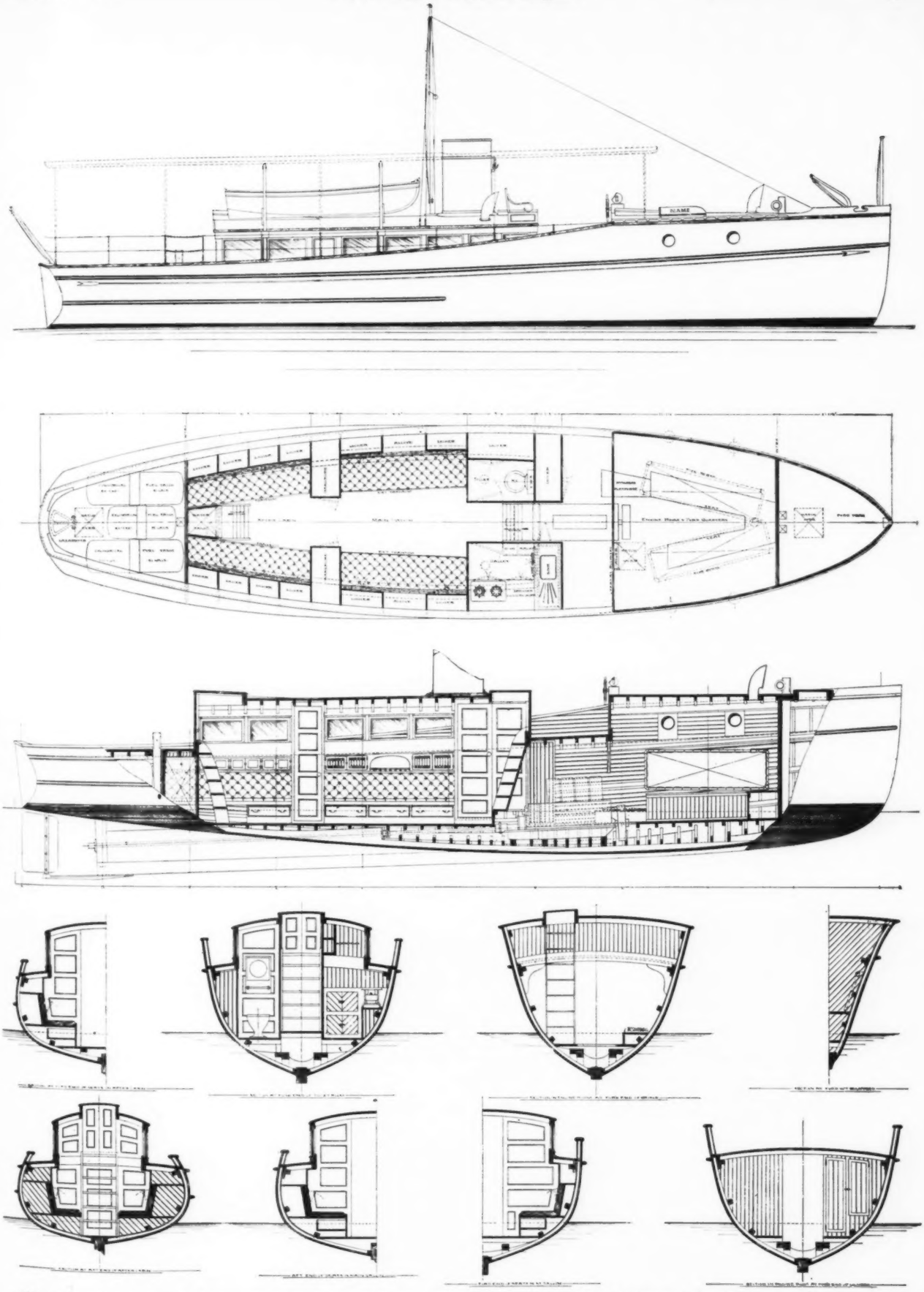
There are many unique features still being worked out on this vessel that will make her a very interesting type for shoal draft service.



Photographs taken during the construction of Kathaga, showing how her stern was tunnelled to meet shallow draft requirements without destroying her lines.



This craft, which is building by the Matthews Boat Company, is an unusual combination of tunnel stern with the steamboat type of hull above the waterline. The vessel is for use principally upon the upper Mississippi and for this reason the construction was attempted. Although she has not yet taken the water, she is far enough under way to give the observer an idea of her finished appearance, and the result seems to be very successful. Photographs showing the details of her interesting construction may be found upon the preceding page.



This craft, which is described upon the following page, is from the designs of Morris M. Whitaker and is a development from a number of vessels of similar design. She is adapted particularly for use in short freshwater seas and the dead-rise forward makes her an unusually seaworthy craft. She is moderately powered, as the owner is satisfied with a 10-mile cruising speed, but her comfortable accommodations make a higher speed undesirable.

A Combination Type of Cruiser.

UPON page 27 are shown the outboard profile, arrangement plan, inboard profile and bulkhead designs of a 44 x 9-foot 9-inch combination raised deck and bridge deck cruiser, upon which work has been started for a Toledo gentleman. The designs are from the office of Morris M. Whitaker, Metropolitan Tower, New York City, and are worked out to give the maximum accommodation with a convenient arrangement plan. The owner wished to be able to steer the boat from as far forward as possible and at the same time to have good interior accommodation, and it was thought that a combination of the two types of cruiser would best suit his desire.

The form has been developed by Mr. Whitaker from a series of designs as being particularly adapted for cruising purposes and gives a good combination of speed, seaworthiness and comfort. The underwater body, as may be recognized from the accompanying plan, shows a deadrise from end to end and the above-water body has a wide flaring bow, with a fair amount of tumble home at the stern so as to give a pleasing outline.

The arrangement plan shows the crew's quarters and engine room forward, the berths for the crew being just aft of the fore-peak and the engine being located under the bridge deck, leaving sufficient headroom at the flywheel to enable the motor to be started without inconvenience. The reverse gear is under the stairs leading from the bridge deck to the main cabin, and access to it if necessary can be easily had by removing the light stairway.

Aft of the motor compartment upon the starboard side is the galley. This is separated by a passageway and a stairway from the bridge, from the toilet room upon the port side. Forward of this, upon the port side, is a small locker room.

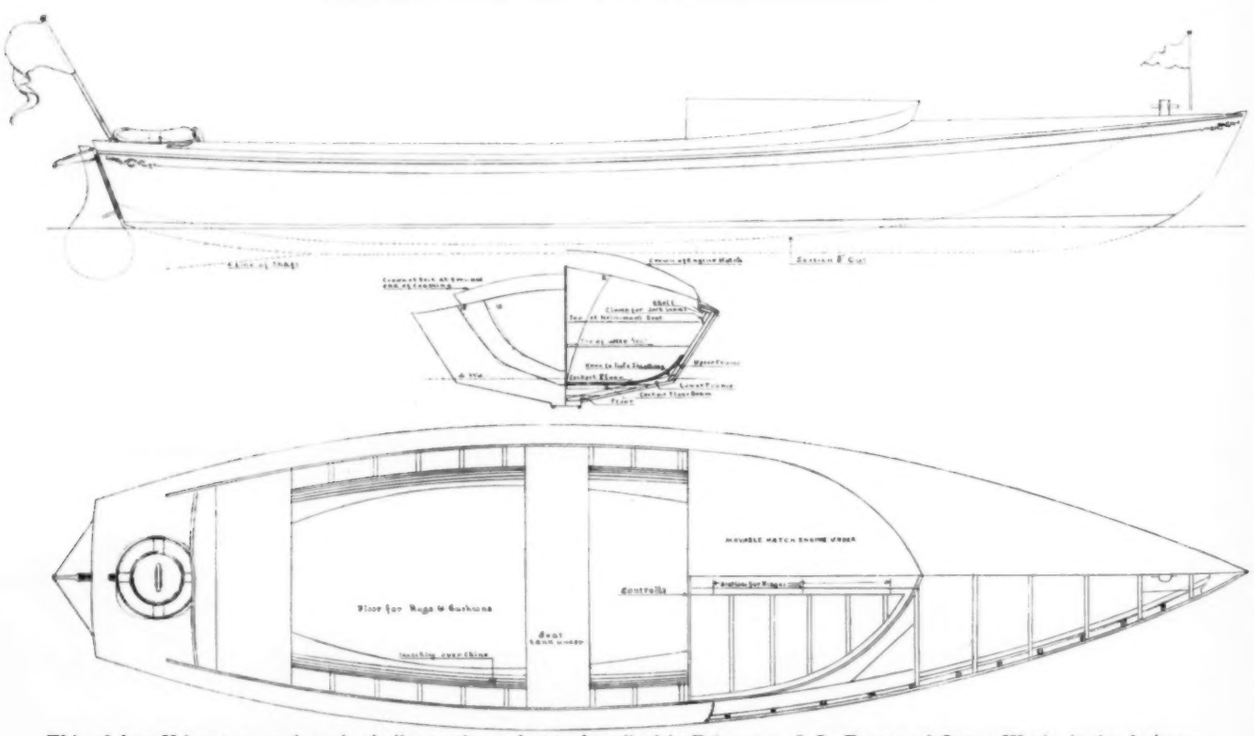
The galley opens upon the passageway connecting with the main saloon, this compartment being equipped with extension transoms and a folding dining table. Locker space is provided above the transoms. Aft of this and separating it from the after cabin is an archway with full-length hanging lockers on either side. The after cabin is fitted with single transoms, one upon each side, with lockers above. The after ends of these transoms are extended under the deck so as to shorten the trunk cabin space above and to increase the after deck space.

The bridge deck, side decks along the trunk cabin and the after deck are on the level of the sheer moulding and under the after deck are located the fuel tanks, three in number, which have a combined capacity of 219 gallons. This is a sufficient supply for a cruise of considerable extent. Between the transoms at the end of the after cabin is located the water tank, which supplies the toilet and galley by a pump.

The hull is of fairly heavy construction and the boat will present a handsome appearance as the deck house and all deck fittings are to be finished in mahogany. Below decks the owner's quarters will have white paneled bulkheads with mahogany transoms, alcoves and lockers back of the seats. The under side of the deck will also be in white enamel, while the crew's quarters forward will be finished in cypress or yellow pine varnished.

The motive power will be furnished by a 30 h.p. Ralaco, which will give a speed, it is expected, of approximately 10 miles per hour.

The form of body used in this craft above the water line forward has been designed especially to make a good sea boat in the short swells the craft is likely to encounter in the waters where she will be used. The vessel will doubtless spend most of her time in the vicinity of Toledo, although she will doubtless be used for extended cruises throughout the entire chain of the Great Lakes and the St. Lawrence River.



This 18-foot V-bottom runabout is similar to the 27-footer described in February. J. L. Foster, of Orcas, Wash., is the designer.

An 18-Foot V-Bottom Runabout.

ABOVE are shown the plans of a small craft designed by J. L. Foster, of Orcas, Wash., who is the designer of the 27-foot boat somewhat similar in type, which was described in the February issue of this magazine.

This boat is 18 feet in length and is one of a series which has been constructed by the same designer, who has paid particular attention to seaworthiness combined with moderate speed when small power is used. Boats of this type will, however, carry a much higher power and prove from experience, fully as seaworthy at increased speed.

The aim of the designer has been to produce a craft that will keep up her speed in a seaway, which is a somewhat unusual performance for a light boat equipped with low power. The boat is easily driven and gives unusual speed results. The design of the hull allows the craft to plane slightly forward at higher speeds so that the displacement is decreased, reducing skin friction and increasing speed. The squatting effect produced by this action has been overcome by making the after sections unusually full.

The motor, as the design indicates, has been placed forward under a removable hatch and the controls are led aft of the steering seat, so that the boat may be operated from one position. Most of the cockpit is left open and only two seats are provided, one across the stern and one just aft of amidships, extending across the whole width of the cockpit.

The straight keel, as in the 27-foot boat by the same designer, holds her to a true course and makes steering unusually simple, even at low speeds.

This type of boat is a graceful one when under way and is a good style for amateur construction, since there is no steam bending of frames nor accurate spacing of the planking to work out. From the working designs, this craft should be a simple one for a man of any average mechanical ability to build.

A 53-Foot Power Cruiser.

THE accompanying plans are of a 53-foot power cruiser designed during the past winter by Swasey, Raymond & Page, Inc., of Boston, for Mr. William A. Hopkins, of the same city, who will use her between Marblehead and Boston and for cruising along the New England coast.

She is a combination of the raised deck, trunk and pilot house type and is one of the first of this type to be built in New England waters.

Her lines show by their unusual depth and deadrise with a flare forward and good buoyancy everywhere, with plenty of freeboard, a plumb stem and overhanging canoe stern, that she was designed to have excellent seagoing qualities.

The construction is heavy and designed for seaworthiness and durability. The feature of comfort for the helmsman has not been overlooked, and a good-sized pilot house has been provided that will not only give a fine place to steer from, in disagreeable weather, but will afford a comfortable little smoking and observation room and also an extra room for one more guest. The pilot house is not unsightly but adds to the appearance of this type of boat; it also serves as a breakwater and spray shield to the bridge and will prevent any water coming aft. This also gives a place where charts may be consulted and navigating done with some comfort and accuracy. A bridge is also provided aft of the pilot house to use in pleasant weather. Engine controls will be installed here as well as bells in the pilot house.

It will be noticed that fire escapes have been provided in the cabin, stateroom, pilot house and engine room by hatches, doors or skylights, as well as the regular entrances, so it will be possible to get out of the boat if a fire breaks out, no matter where one is. Watertight bulkheads are provided aft of the stateroom forward of the gasoline and between the engine room and galley. Careful attention has been given to ventilation, and all rooms have ventilators, open ports or windows as well as hatches, skylights, etc.

The arrangements below decks are similar to those on Gardenia, Topaz IV, Gee Whiz V and several other boats that were designed by this firm and is of the standard arrangement developed by them on boats of this size. This gives privacy and accessibility and a place for everything without being crowded. The vestibule gives a place to take off wet clothes and keeps the cabin and stateroom and rest of boat dry.

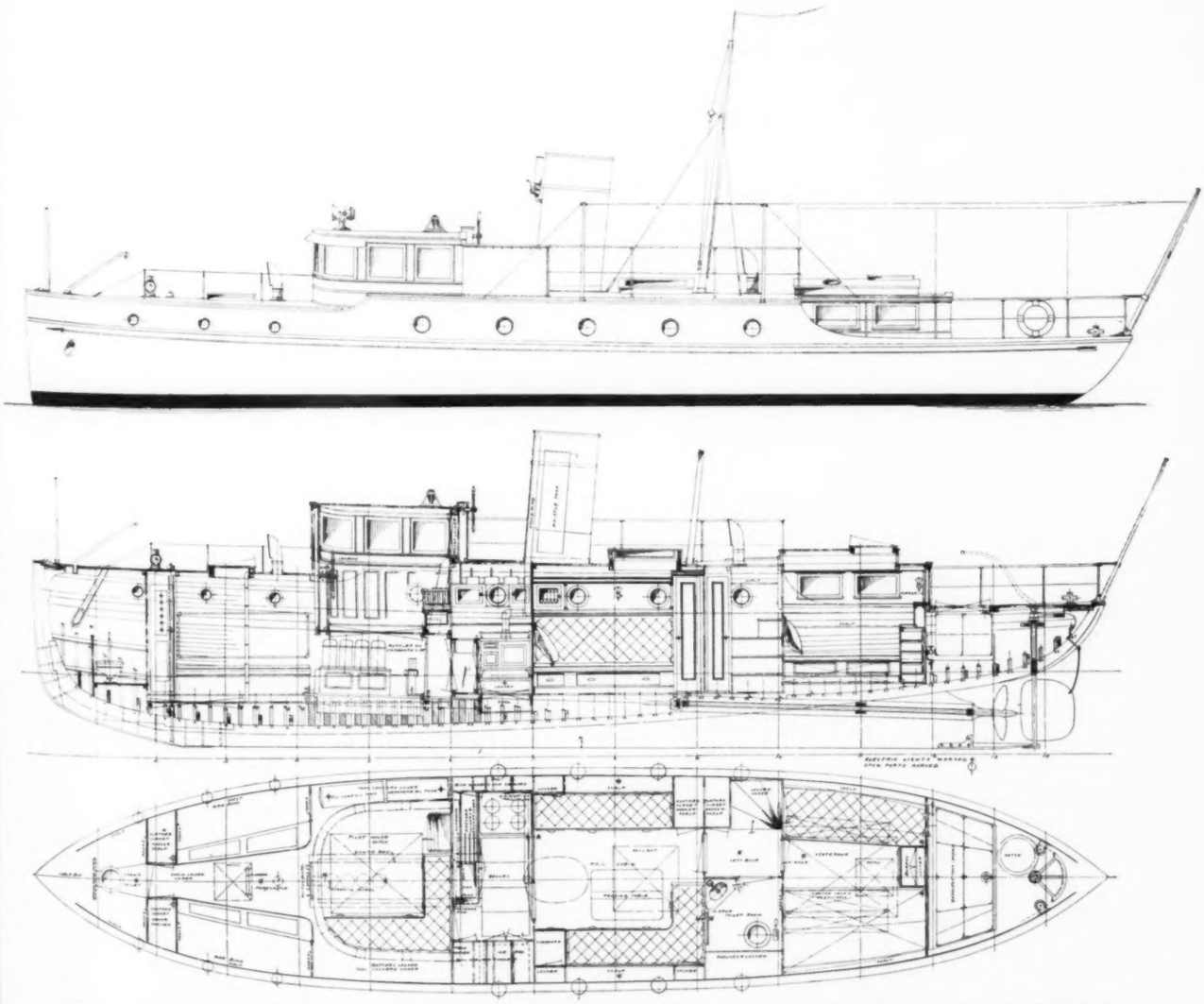
The sleeping accommodations are surprisingly large, providing for a total of ten persons, as follows: Forecastle, two (and by using transoms, four); pilot house, one; main cabin (by using the Pullman berths and transoms), four; stateroom, three. All the rooms are well found, the crew having a separate toilet room and there are numerous clothes-closets and lockers, while the galley is situated to serve the food either in the cabin or forecastle.

This is an arrangement that is regarded as the standard for small cruisers. The galley is very fully equipped and has a coal stove, sink, ice-chest and all the usual lockers and shelves. The cabin will be finished in white with leaded glass in the lockers and sideboards and tapestry panels, while the other rooms will be equally well fitted.

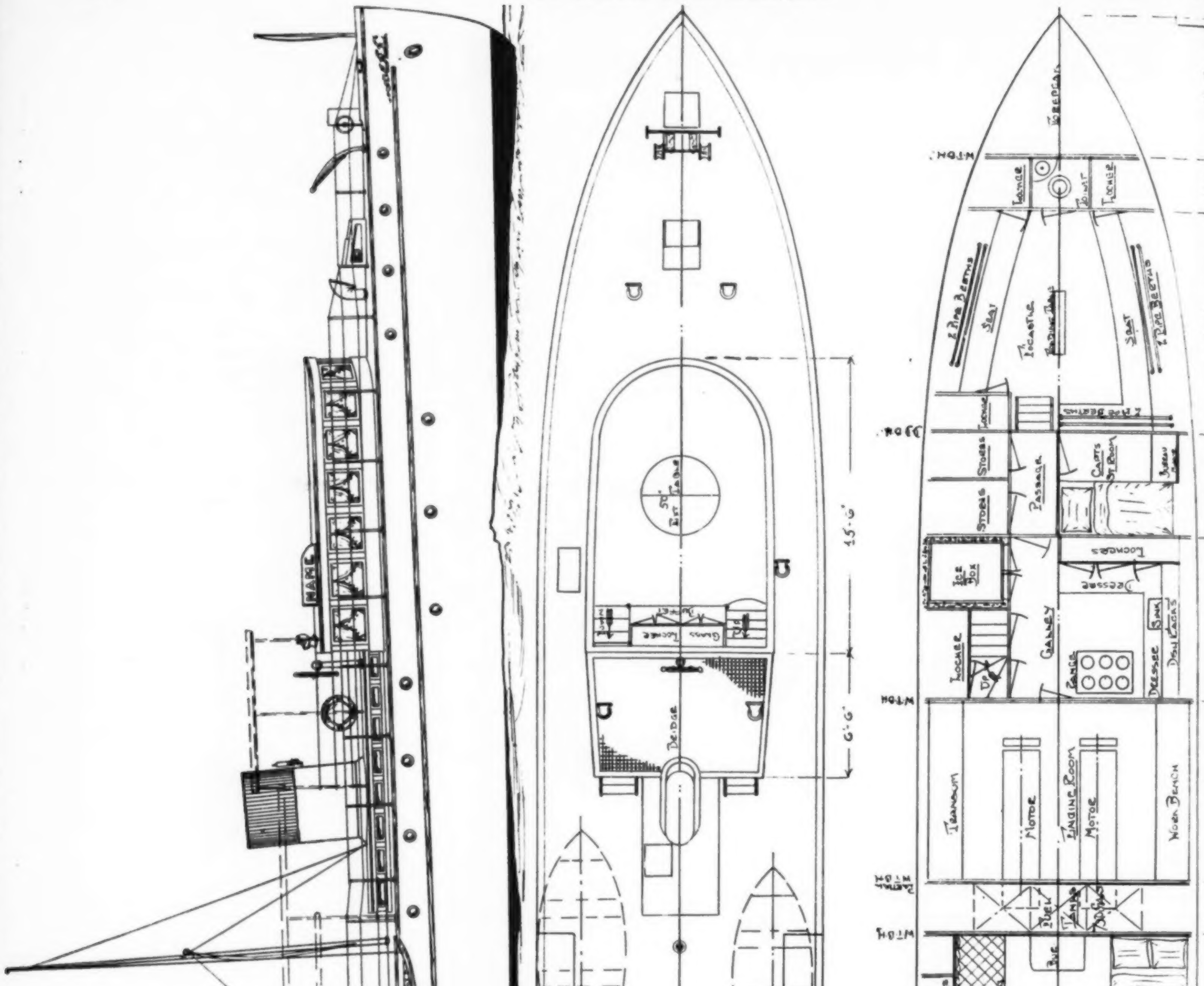
The gasoline tanks with a capacity of 180 gallons and the water tanks with a capacity of 90 gallons are sufficient to give a good cruising radius. The engine will be a 40 h.p., 4-cylinder, 6½ x 8-inch, 4-cycle machine of the slow speed, heavy-duty type, turning a large propeller with good efficiency, which will give a speed of about 10½ knots.

An electric lighting outfit and searchlight will be installed. The vessel will be an excellent seagoing power cruiser and will still have the style and snap that the stacks, bridge and other effects are intended to add.

The dimensions of this craft are: Length over all, 53 feet; length water line, 49 feet 4½ inches; beam, 118 feet; draft 3 feet 9 inches.



This vessel is a combination of the raised deck and trunk cabin type with a pilot house and is one of the first of this type for New England waters.



A 90-foot cruiser designed by Whittelsey & Whittelsey and described upon the following page. This vessel is now building and will be ready for delivery June 7.

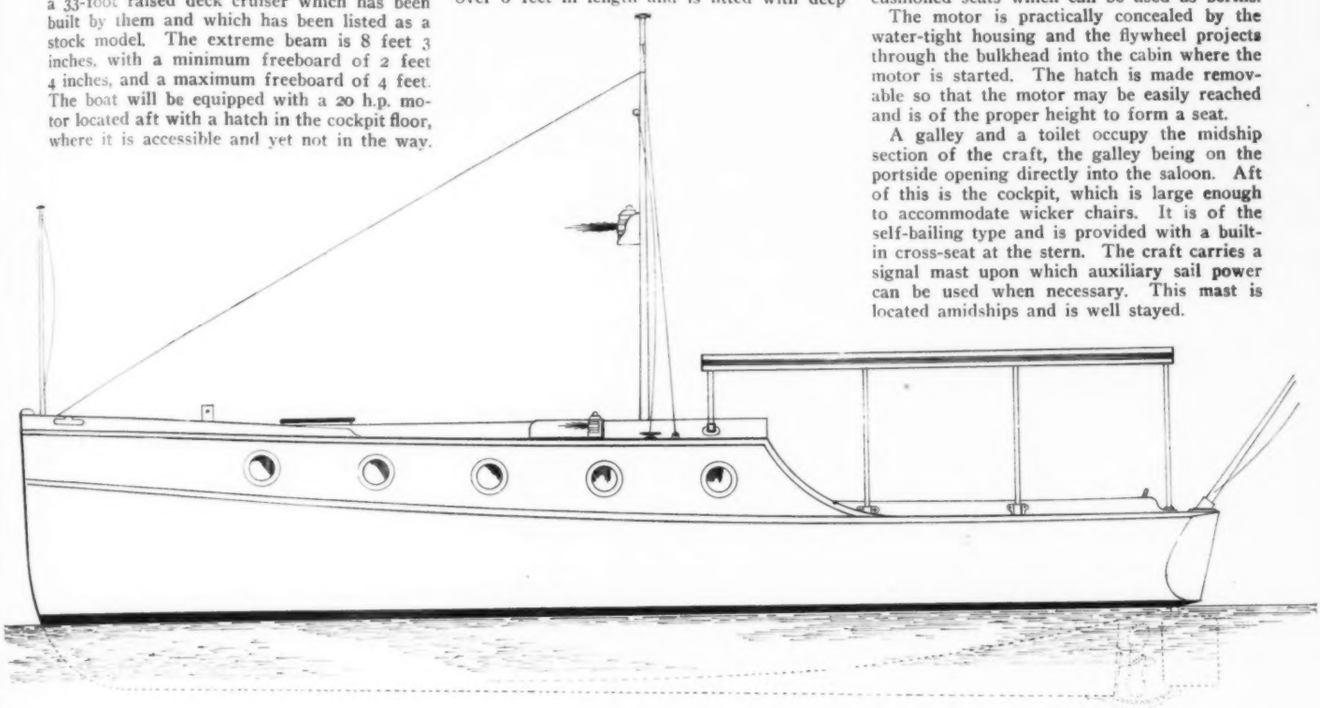
A 33-Foot Stock Cruiser.

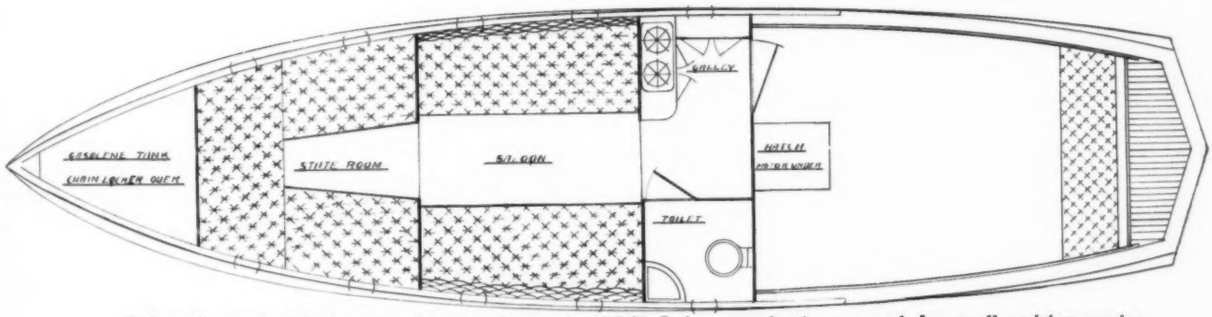
THE designs shown below are from the shops of the Bayonne Launch Company, Bayonne, N. J., and show the plans of a 33-foot raised deck cruiser which has been built by them and which has been listed as a stock model. The extreme beam is 8 feet 3 inches, with a minimum freeboard of 2 feet 4 inches, and a maximum freeboard of 4 feet. The boat will be equipped with a 20 h.p. motor located aft with a hatch in the cockpit floor, where it is accessible and yet not in the way. The frames are of oak with steam bent ribs and cedar planking, copper-fastened.

The stateroom forward measures a trifle over 6 feet in length and is fitted with deep cushioned seats which are designed to be made up as berths. Aft of this and located almost amidships is the saloon, also supplied with cushioned seats which can be used as berths.

The motor is practically concealed by the water-tight housing and the flywheel projects through the bulkhead into the cabin where the motor is started. The hatch is made removable so that the motor may be easily reached and is of the proper height to form a seat.

A galley and a toilet occupy the midship section of the craft, the galley being on the portside opening directly into the saloon. Aft of this is the cockpit, which is large enough to accommodate wicker chairs. It is of the self-bailing type and is provided with a built-in cross-seat at the stern. The craft carries a signal mast upon which auxiliary sail power can be used when necessary. This mast is located amidships and is well stayed.





This 33-foot raised-deck cruiser is a popular stock model. It is conveniently arranged for small cruising parties.

A Ninety-Foot Cruiser.

UPON the preceding page are shown the outward profile, deck plan and below-deck arrangement of a 90-foot vessel with a 15-foot beam, which has been designed by Whittelsey & Whittelsey, of New York City, and is being built for Mr. N. Bruce MacKelvie, of New York, and Mr. C. L. F. Robinson, of Hartford, Conn. The vessel is under construction at the yards of the Hudson Yacht & Boat Company, of Nyack, N. Y., who were the builders of Itasca II, by the same designers.

This vessel is similar to the cruiser Itasca in a number of particulars, foremost among which is the sunken deck house, 17 feet in length, which is used as the dining saloon. The raised deck type of construction has been used with the break in the sheer slightly abaft the middle body so that seaworthiness is provided and the general appearance of the craft is considerably beautified. This break in the sheer line has been so arranged that side windows may be used in every stateroom, thus providing unusual ventilation.

The entire raised deck section is utilized, as well as the main deck, and the bridge deck is located abaft the deck house, where the vessel may be handled with the greatest ease. Aft of the bridge is the funnel into which the engine will exhaust.

The stern of this vessel is of the overhanging transom yacht type with a flat underbody and the draft has been limited to 4 feet to enable the vessel to travel in the shallower waters of Florida.

Below decks the interior accommodations consist of a forecastle forward, aft of which is the captain's stateroom and a store-room, followed by a good-sized galley, measuring 8 feet 9 inches in length and extending the full width of the boat. The engine room, in which are installed two 90 h.p., 6-cylinder Sterling motors, is aft of the galley and the gasoline tank compartments are aft of this. The total amount of gasoline carried is 750 gallons.

Aft of the gasoline tank compartment is the owner's stateroom, which is a double room the full width of the vessel, and aft of this upon the port side is a bath-room with a companionway passage leading to the deck. Aft of this space are two double staterooms for guests. The after stateroom communicates with the deck by means of a companionway.

The entire finish of the interior is to be polished African mahogany in the owner's quarters, with white bulkheads and side panels, while the engine room, crew's quarters, galley, etc., will be finished in painted North Carolina pine. The deck house will be finished in polished African mahogany and the joiner work will be of the same material.

The craft will be electrically lighted and handsomely finished throughout, and she is expected to maintain a speed of 15½ miles per hour. Delivery is expected on June 7th.

A 90-foot cruiser designed by Whittelsey & Whittelsey and described upon the following page. This vessel is now building and will be ready for launching early

A 77-Foot Shoal Draft Twin Screw Cruiser.

A VESSEL for Southern use, whose plans are shown below, has just been designed by the Racine Boat Company, of Racine, Wis., and is interesting because of the type of construction used, so that the vessel may be able to navigate in shoal waters in which her owner desires her for the most part to be.

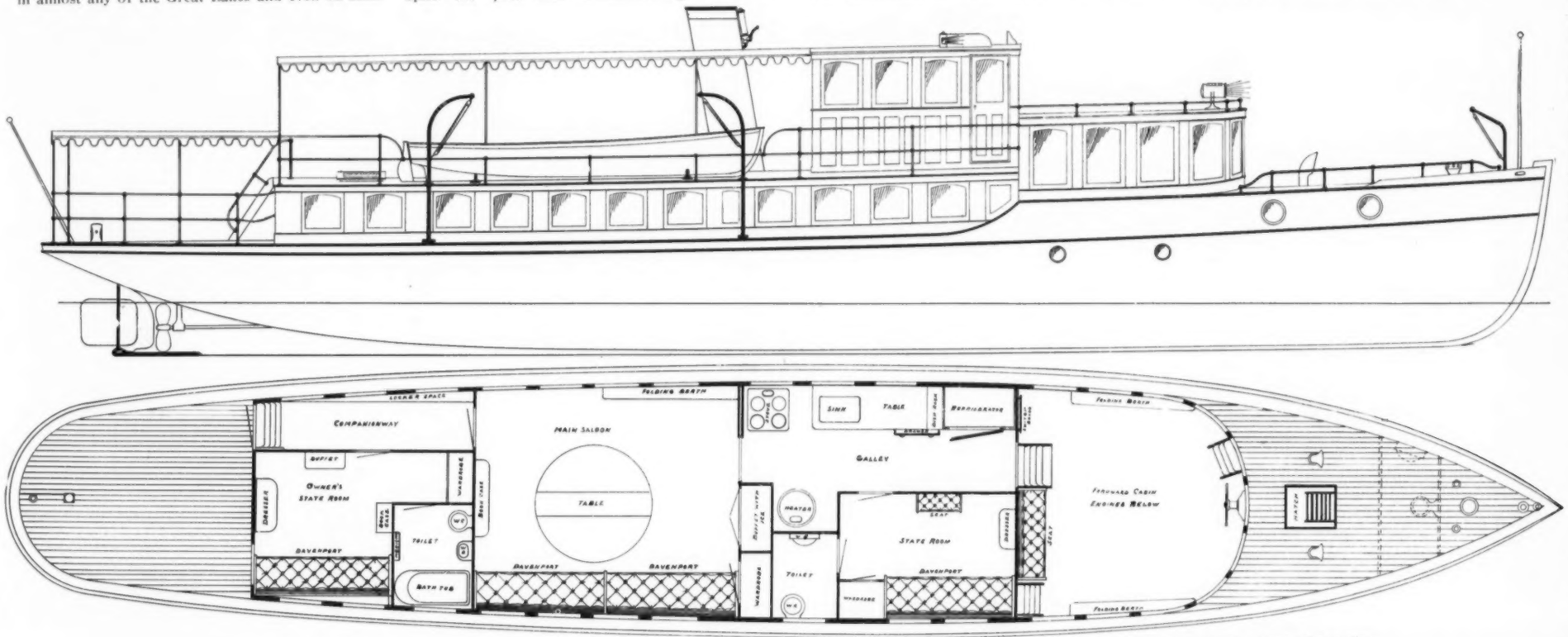
Her length over all is 77 feet, with a beam of 14 feet and a draft of 2 feet 6 inches. It will be noticed that the draft of this vessel is unusually light for one of her size. In the designs, however, due consideration has been given to sea-going qualities, although of necessity her draft was kept as light as possible. A study of the lines of this craft will show her sea-going qualities, and the raised sides forward give her an added appearance of staunchness. She will be able to weather the average storm in almost any of the Great Lakes and even do some offshore cruising, except at the stormiest seasons of the year.

The arrangement includes a large cabin forward, fitted with circular windows with a stairway leading to the forward deck on the port side and another stairway aft, leading down to the galley. This forward cabin is directly above the motors and is fitted with a comfortable settee and folding berths upon either side. An electric switchboard also forms a part of the equipment of this room, as well as a steering wheel, so that the vessel can be controlled from this cabin. The stairway shown upon the starboard side in the lower plan, leads to the upper deck, which is railed off and furnishes out-of-door accommodation, if desired. Aft of the forward cabin is a stateroom upon the starboard side, equipped with a davenport, wardrobe, a dresser and a seat, and upon the port side communicating with the forward cabin by the stairway mentioned, is the galley.

The galley is fitted with a Ship-mate range, a sink, table, drawers, dish-racks, large refrigerator and a hot-water heater. A toilet room occupies the space to the starboard of the galley and aft of the stateroom. Aft of this section, which forms the midship portion of the vessel, is the main saloon fitted with two comfortable davenports, a round folding table, a bookcase, a built-in buffet, wardrobe and a folding berth. This will be used as the main dining saloon.

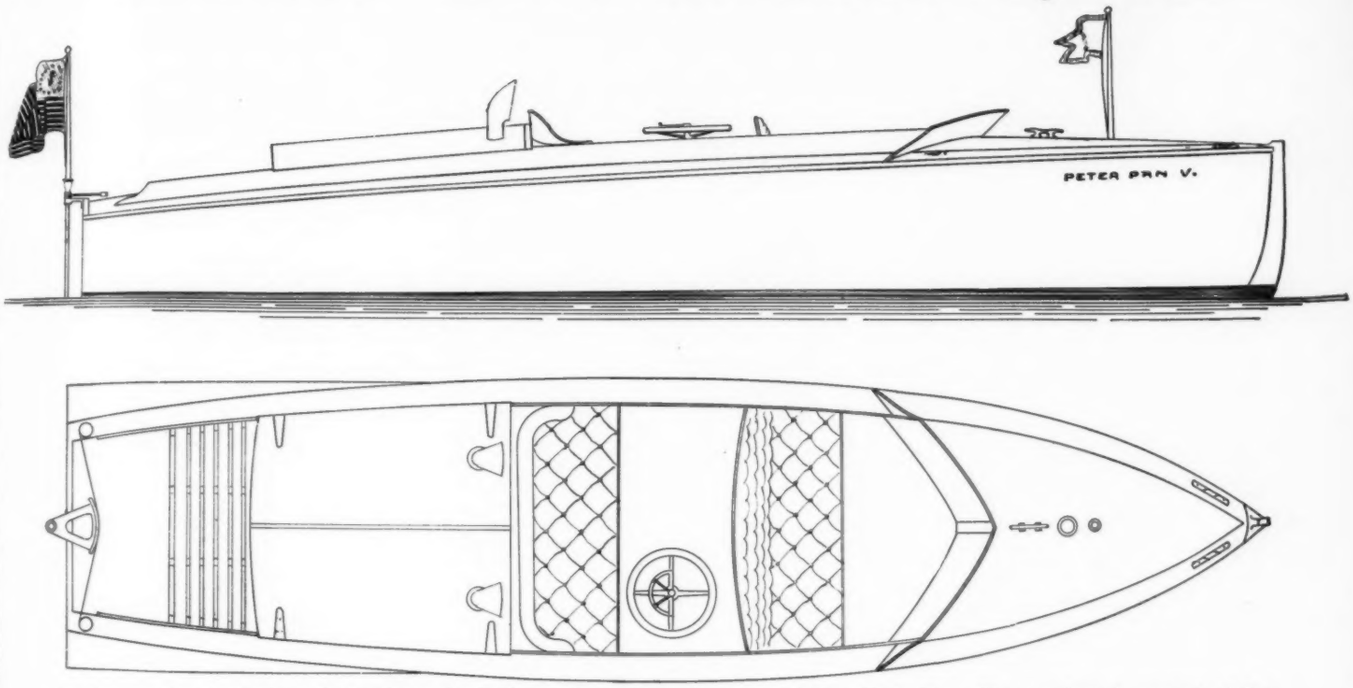
Aft of this is a companionway from which opens the owners' stateroom on the starboard side. This room is fitted with a wardrobe, davenport, dresser, bookcase, a buffet and opens into a private bath upon the starboard side.

The pilot house is located upon the deck above the main deck and is fitted with a large settee, a polished brass binnacle with a compass, and all the necessary equipment. The engine controls are carried through to the pilot house and the after end of this house is fitted with a single berth and a seat to be used as the captain's stateroom. This vessel is fully equipped and carries an 18-foot power tender, as well as a 10-foot dinghy swung upon davits on the cabin roof. A hot-water heating system is provided, with hot-water radiators distributed in the different rooms and the engines are installed under the floor of the forward cabin. The crew's quarters are also located in this compartment and are fitted with a separate toilet and pipe berths. The lighting plant, consisting of a dynamo and storage batteries driven by a separate engine, is also installed in this compartment. The boat is electrically lighted and is equipped with an electric searchlight.



This cruiser is a product of the Racine Boat Company and possesses unusual seaworthy qualities. She has much more room than the average vessel of her size.

Another Rival 20-Foot Hydro.



Another 20-foot hydroplane designed by the Reliance Motor Boat Company, of New York City. The new boat is guaranteed for the remarkable speed of 36 miles an hour and will be completely illustrated with photographs in a later issue.

SINCE the article on fast 20-foot hydroplanes appeared in the last issue, we have received particulars of the new Peter Pan V, recently designed by the Reliance Motor Boat Co. of 210th street and the Harlem River, New York City. The new boat, the profile and plan of which appear herewith, is another 20-footer of 5 feet beam with the remarkable speed of 36 miles an hour guaranteed. The boat is double planked, the under layer being of white cedar and the outer skin of selected Mexican mahogany. Union silk is placed between the two layers. The timbers are of straight grained white oak with spruce clamps running the full length of the boat, forming the engine bed supports.

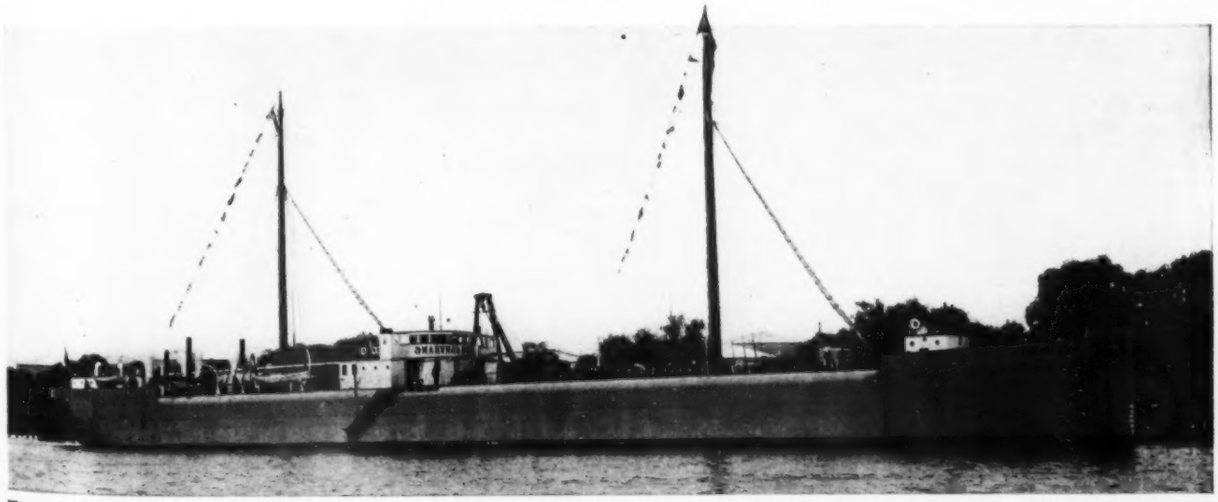
The motor is aft of the steersman's cockpit and is under hinged hoods, being ventilated by two cowls fitted into the hatches. A small engineer's cockpit is located aft of the motor and, as may be seen from the profile drawing and the plan, the craft has a carrying capacity of five persons. Two thwart seats are provided forward of the motor compartment, the steersman's seat being located directly aft of these, with the wheel and controls upon the starboard side.

A spray board is located forward of the passenger cockpit, which is arranged for fastening a canvas apron to cover the entire forward seat when racing. There is a pronounced flare forward, so that the boat is an unusually dry one. The chine is continuous from stem to stern and runs high up forward of the bow. It is constructed of oak and is rabbetted to receive the planking.

This boat is equipped with a special Reliance six-cylinder motor of the four-cycle type construction, with valves on the opposite sides. The bore is 5½ inches and the stroke, 6½ inches, and while the motor is rated at 50-60 h. p., it will develop upon brake test, 90-100. The oiling system is self-contained and there is supplied an extra water circulation between the oil pump and the base proper. The ignition is of the double point system and the propeller drive is through special Reliance transmission gears. The strut is hung aft of the propeller, eliminating a material amount of resistance and allowing the wheel to turn in solid water at all times.

The fittings and furnishings of Peter Pan V are of the highest order and are similar in this respect to Peter Pan IV, which carried away ten trophies during the 1911 season.

Fast hydroplanes with a guaranteed speed are rapidly coming into favor since their reliability and simplicity of operation has become known, and the past winter has brought forward a greater number of these craft than their most enthusiastic supporters had imagined. Hydroplanes of this type when at rest in the water, are not materially different in appearance from the standard displacement boat and it is only when under way that their novel construction asserts itself.



Emanuel Noble, a 1200 h.p. Kohmnaer-Diesel engined tank vessel of 4,821 tons capacity, in the service of Messrs. Noble Bros. Naphtha Company, on the Caspian Sea.

New Things for Motor Boatmen

A New Marine Search-Light.

The Apple Electric Company, Dayton, O., have improved the design of their electric searchlight so that it is now made particularly for marine use with a standard as shown in the accompanying illustration. The lamp is of the bullet shape. It has no hinges or outside fastenings, the door being held in place by two metal fingers operated by screws in the pivot lugs. These can be turned only by a key, so that the bulb cannot be removed by unauthorized parties. Focusing is accomplished by means of a screw at the rear of the lamp, which draws the socket in or out until the proper illumination is secured and an extra deep silver parabolic mirror is used so that a powerful light is projected for a great distance. The lamp is arranged for either deck or cabin control and can be supplied in brass, nickel or black enamel finishes.

* * *

Acetylene Gas Burner Attachment.

J. Ferguson, 9 West 63rd Street, New York City, has just placed upon the market an attachment for use with oil lamps so that they can be readily converted to burn acetylene gas with as small a flame as desired, for running lights or tail lights. The illustration on this page shows the application of the attachment. This device can be used with any kerosene lamp simply by filling a one-quarter inch hole in the lamp, through which the stem passes. This stem is long enough to fit any lamp and it should be cut after being applied so that about one inch will project outside of the lamp to connect with the gas tank or generator. The attachment is not soldered or fastened in any way and can be removed with the kerosene oil well if desired. The wind cannot blow out the lights and the device is equipped to burn only one-eighth of a foot of gas per hour, so that an ordinary tank will last from 200 to 300 hours with three lights burning. It is not necessary to change the kerosene attachment in any way so that the oil may be used for emergency whenever desired.

* * *

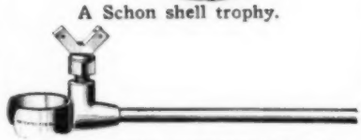
Golde Patent Top.

The top which is shown in the accompanying illustration is handled in this country by the Golde Patent Manufacturing Company, 509 West 56th Street, New York City, and is somewhat original in its operation, inasmuch as it has but a single pivot on each side around which the top turns while being raised or lowered. An extension is provided similar to the lazy tong, so that the top may be raised or lowered through the single operation of raising or lowering the second top bolt and thereby folding or unfolding the hinges. This top has been used for a number of years throughout Europe and is adapted particularly to automobiles and motor boats. It is furnished in all sizes up to 220 inches and with two different equipments. Equipment A includes tapering oval steel rods, with all other parts made of steel with the exception of the end pieces, and finished in black enamel. Equipment B is furnished with wooden bows and trimmings made of steel and rod iron, the trimmings being enamelled in black and the wooden bows varnished to retain their natural color. Both models are covered with waterproof canvas, mohair or pantasote and are furnished with side and back curtains and celluloid windows.

The Apple marine searchlight.

The Columbian outboard rudder outfit.

A Schon shell trophy.



The Ferguson acetylene burner.

The Golde top for motor boat use.

A Webbperfection range.

Columbian Outboard Rudder.

On of the latest things brought out in the motor boating field is a combined outboard rudder and universal strut made by the Columbian Brass Foundry of Freeport, L. I., N. Y. This device comprises a universal strut designed for use aft of the propeller, which supports a light outboard rudder of manganese bronze. When necessary to remove the propeller, the strut can be slid out of its bracket by simply removing two bolts. The outfit is complete with a quadrant tiller and is built with an unusual amount of strength. The strut bearing is self aligning and is fitted with the new feature found this year upon all Columbian universal struts, namely, die cast auto-friction bushings, which may be replaced when worn.

* * *

Rub-On Lining Dye.

The Rub-On Varnish Company, of Buffalo, N. Y., have recently brought out a concentrated dye which is designed for use upon motor boat tops for recoloring the linings and making them waterproof. It is sold in concentrated form in one-pint cans and by adding to it three pints of gasoline, enough dye is made to finish one top. The dye is easily applied with a sponge and will cover the entire fabric at one application without removing the top. The gasoline carries the dye into the cloth and spreads out rapidly, thus insuring an even and satisfactory finish. It is made in black only, as many linings have some dark spots which could not be eliminated with a lighter dye. The material of which it is made is waterproof and the results have been very satisfactory.

* * *

A Novel Trophy.

Carl Schon, 213 N. Frederick Street, Baltimore, Md., has branched out into the loving cup and trophy field with his novel form of conch artistry and works of all descriptions may now be had in the form of club trophies. The illustration shows one of the shells, which has been treated by his method. This method consists of electro plating the actual shell with pure silver and then polishing the silver and cutting out the parts necessary to allow the original shell to be seen. The silver plating is highly polished and all shells are shown in their actual original beauty, the silver armor merely acting to strengthen the article and enhance its beauty. These articles are made in all sizes and shapes of every kind of shell, the particular one shown calling for $60.00.

* * *

Webbperfection Range

The Elisha Webb & Son Company, 130 South Front Street, Philadelphia, Pa., are making a range designed particularly for use upon large and small motor yachts, and in addition this is fitted with a circulating system so that hot water may be supplied in any part of the boat. The smallest range is 2 feet in width and 20 inches in depth and costs $180. From this size, they run up to 12 feet in width at a cost of $540. All of the ranges are fitted with guard and cross rails 5 inches high. Enclosed plate shelves or warming closets with sliding doors can be fitted to a range of any size and additional circulating boilers can be added as desired. Necessary fire tools are supplied with each range, and in addition to this a brass combination force pump to supply the sinks and circulating boiler.

From Motor Boating Readers.

A Department for the Exchange of Ideas and the Discussion of Questions of General Interest. Editorial Opinion on a Number of Questions Submitted by Readers of the Magazine.

MoToR BoatinG's columns are open to its readers, not only for asking questions, but for placing before other readers ideas, results of experience, opinions, etc., that should be interesting or helpful to them; but the editor will not, of course, be responsible for any opinions expressed or statements made in such communications. The name and address of the writer must necessarily be given in every case to make an answer by mail possible (no anonymous contributions will be considered for publication), but names will be omitted in publishing the letters and answers where desired, in which case it is desirable that initials or other distinguishing signature be appended. Through the correspondence department readers of the magazine may be of direct aid to one another in solving the problems of motor boating.

Teredo Discourager.

To the Editor of MoToR BoatinG, *Sir:*—

I have it on the authority of one who has used it for years, the reliability of the following as a protection against the teredo boring worm. This worm appears to be very active around the mouth of the James River, but gives no trouble to those who use this formula: All and any old paint at hand is mixed together and about 25% Paris green added and the lot thinned with boiled linseed oil. Surface is sanded to smooth finish and several coats painted on. It requires only an occasional painting of a coat to keep it in trim. See that the cracks and seams are well filled and the results will be as satisfactory as can be expected short of copper sheathing. A little enamel is said to help.

L. P. Prince, Philadelphia, Pa.

A Question of Draft.

To the Editor of MoToR BoatinG, *Sir:*—

I am getting ready to build a boat 23 ft. long 56 inches beam with raking transom stern and a draft of 9" or 10" at the bow, and running down to practically nothing at stern. Expect to install a motor of about 7 to 10 h. p. and on account of shallow water we have to contend with, I want to get the draft down as much as possible. Would like to ask you if you think it would be practicable to equip the boat with twin screws and run them from the one motor with chains and sprockets and whether we would get results by using propellers as small as 10" 3 blade and gear them up to use the full horsepower of motor. Also please state what style of wheel would be best for the purpose, and if a 4 blade wheel even smaller than 10" would be suitable.

A. H. S., Tiffin, Ohio.

[As you have not stated the revolutions of your engine, it is impossible to answer your question directly. However, if we consider 700 revolutions per minute the maximum speed for a twin screw installation, the wheels should be about 14 inches in diameter by 20 inches pitch. Certainly smaller wheels would not do for such a high power. Chain driving at this high speed is not advisable as chains are likely to break, absorb considerable power and are noisy. It must also be borne in mind that the wheels would be exposed. Small four blade wheels would not be advisable. A tunnel stern, using a single screw, would be better, and in such a case the wheel would be entirely protected in grounding.]

About a 25-Foot Cruiser.

To the Editor of MoToR BoatinG, *Sir:*—

I have a raised deck cruiser 25' x 6' 9", draught approximately 26" maximum, 18" to rabbet. This boat was built to the plans of F. S. Nock, as published in your book, but with a little finer lines and other slight modifications. She is powered with a 5½ h. p. single cylinder Ferro, turning a 3 blade 16" x 16" wheel. Maximum width of blade is 4¾". Under favorable conditions I get 720 r. p. m., with a speed of about 7¾ miles per hour. This seems a very good performance and I think the engine is doing better than her rating. However, the slip, which I figure out at about 30% seems rather large.

Could you suggest any improvement in the dimensions of the propeller? I may change over to an 8 h.p. Ferro, and would like to know what propeller you would advise in that event, and what speed I may expect. Is there any particular make or model of wheel that you would recommend for this boat? I could arrange to swing an 18" wheel if necessary.

I am thinking of fitting on bilge keels to steady her up a little more in a seaway. Could you give me any instructions for determining the proper size, location and line of direction for bilge keels?

W. A. Winfield, Sidney, Nova Scotia.

[In making 7¾ miles per hour, your boat is doing very well. In such a case 30% is not too large and I would not suggest changing the screw. Should you install an 8 h. p. Ferro, 8½ miles per hour might be expected. For this engine a 16" x 20" three blade wheel would be advisable. A large blade area is desirable or say one of a surface ratio of 50%. If bilge keels are to be fitted to your boat, they should be wedge-shaped, say of yellow pine 3 inches by ⅝ inches by 1½ inches fitted about half the length of the boat. They should be low on the bilge, normal to same and located in a plane to give the least possible resistance when running. The best method of locating them is to lay off sections of the boat and pass a plane through them, as suggested. As keels decrease the speed of small boats, ballast is preferable. If there are any portable weights located rather high in the boat, lowering these would decrease the rolling but would of course make the boat recover more jerkily in a seaway.]

One or Two Engines.

To the Editor of MoToR BoatinG, *Sir:*—

I intend building a cruising boat. I have two gasoline engines, 5¼" x 6" two cylinder four cycle Lamb, that I want to use with twin screws, 22" diameter, 3 bladed, 28" pitch supposed to give 12 h. p. each at 500 revolutions. Would they be equal to or better than a four cylinder 24 h. p. of the same make, that is to say would the two engines give me the same speed as the single 24 h. p. or more speed? Would it be advisable to let both propellers turn in the same direction or in the reverse? Can engine be made to turn in opposite direction from the other by changing the valve cams? At present they both turn in the same direction. What is the proper direction for propellers to turn, both toward the center of boat or toward the sides, and what would be the proper distance apart for the center of both propellers, say in a boat 45' x 10'.

N. A. Morano, New Orleans, La.

[One four cycle engine of 24 horse-power at 500 r.p.m. would be superior to two 12 horse-power engines at the same revolutions. In the first place there is a saving of weight of 450 lbs. and a larger wheel can be used, which is an advantage. In any case the extra speed would be small. In case twin screws are used the engines should rotate outboard. Both engines rotating in the same direction give a turning moment which has to be compensated by using the rudder, which, of course, decreases speed. The propeller should have at least 2 inches clearance from the hull, or in case of flat bottom boats, the tips should clear each other by 2 inches. The valve cams on the Lamb engine cannot be changed to alter the direction of rotation of the engine.

Equipment for a Cruise.

To the Editor of MoToR BoatinG, *Sir:*—

I am going off on a long cruise in my 40 ft. Elco Standard cruiser and the following problems are bothering me. Will two 60 pound stockless anchors hold her in had weather? Do you advise the use of rope or chain for all round use with ground tackle? (If chain, what size?) What is the proper method of making oil bags and what kind of oil is the best? What is the best way to construct and what should be the dimensions of a sea anchor for my boat?

G. W. Bell, Washington, D. C.

[Instead of the two 60 lb. anchors you suggest, we would advise one 30 lb. kedge for every day use, another of 50 lbs. and one of 75 lbs. for emergency use. The latter two may be of the stockless type and we would advise chain for these two, 5-16" for the 50 lb. and ⅜" for the 75 lb.

You can buy a ready made bag at the ship chandlers, which when perforated and filled with oakum or waste saturated with any cheap, heavy oil, will make an excellent oil bag.

The sea anchor should be constructed as follows: To a heavy ring about 3 ft. in diameter lace a conical bag of heavy canvas. From three equally spaced points around the rig run a bridle to which the line is made fast several feet from the mouth of the bag. A light trip line should be made fast to the apex of the bag, to facilitate hauling it in.]

Too Well Muffled.

To the Editor of MoToR BoatinG, *Sir:*—

Last summer I had a runabout built from the plans given in the December, 1911, issue of MoToR BoatinG, and installed a two cycle two cylinder engine of 6½" bore and 4¾" stroke. It should run at 1000 r. p. m. but with a 20 inch diameter by 25 inch pitch three-blade wheel, I have never gotten more than 750 to 800 r. p. m. and between 15 and 16 miles an hour. In the exhaust line I have a silencer, a muffler and an underwater exhaust. To what extent do these hold the engine down? How much more speed would I get by free exhaust? Would a change of wheel be advisable?

E. P. S., Center Harbor, N. H.

[Your motor is evidently suffering from back pressure due to the various silencing devices you have installed. We would suggest the use of a muffler alone or else an underwater exhaust with plain expansion chamber. Free exhaust would add probably as much as one mile per hour to your speed. An 18" x 24" three-bladed wheel should give better results than the one you now have.]

Under-Water Exhaust.

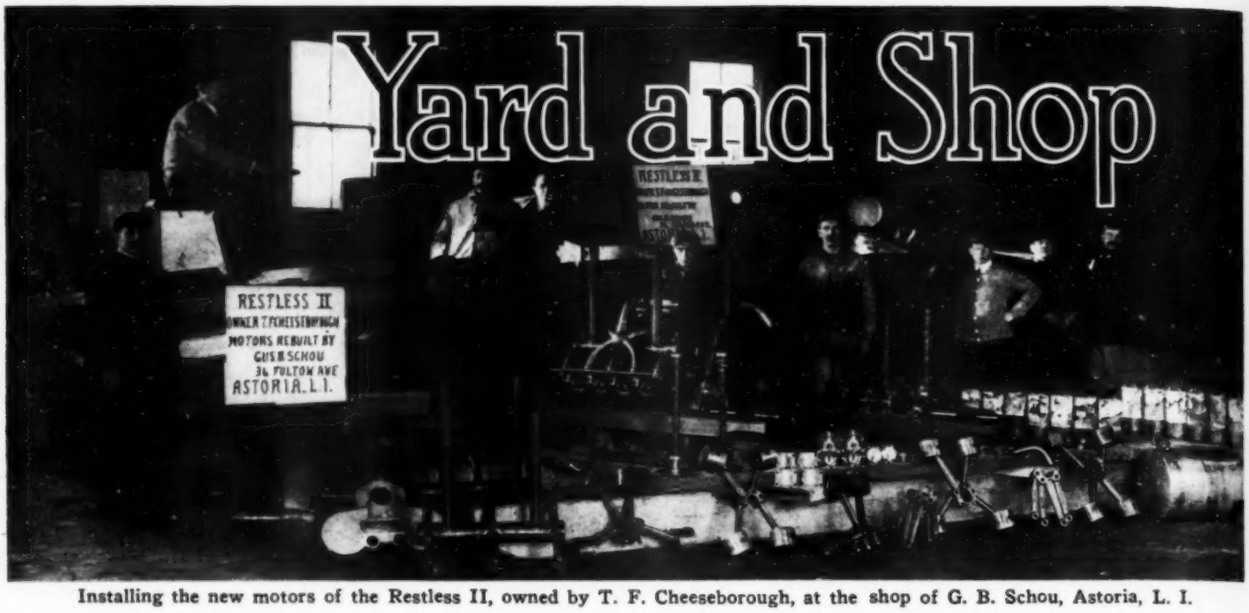
To the Editor of MoToR BoatinG, *Sir:*—

I am installing an under-water exhaust in a 15 ft. boat with a 4 h. p. engine. I want to exhaust as near engine as possible which is 17 inches forward of amidships. Is it necessary to use an expansion chamber and if so would a muffler be all right?

H. M. Lount, Toronto, Canada.

[An expansion chamber several times the cylinder volume is necessary for good results and a muffler would do if the baffle plates were removed, but the regular cast iron chamber would be better. If it is not necessary to run the exhaust out near the engine, we would advise running this to the stern a trifle above the water line when the boat is at rest. This will give an unobstructed exhaust when starting but when the boat is under way the settling at the stern will submerge it.]

Yard and Shop



Installing the new motors of the Restless II, owned by T. F. Cheeseborough, at the shop of G. B. Schou, Astoria, L. I.

Oregon Speed Boat Makes New Record.

Motor boat enthusiasts of the Pacific Coast are feeling justly complacent over the establishing of a new world's record for a thirty mile course by Oregon Wolf, built and raced by Johnny Wolff of Portland. On February 25th Oregon Wolf raced against time on the Willamette river over a course of 30 miles, covering the distance in 42 minutes 14 2/5 seconds, an average speed of 42.8 miles per hour. Previous to this, the record for this distance was held by the Dixie IV of St. Louis with an official time of 44 minutes 33 and 1/5 seconds. The following table gives the times for each lap:

Distance	Lap time	Elapsed time
5 miles	7:06 4/5	7:06 4/5
10 "	7:04 2/5	14:11 1/5
15 "	7:00	22:11 1/5
20 "	7:01	28:12 1/5
25 "	7:05 2/5	35:17 3/5
30 "	6:56 4/5	42:14 2/5

The last lap was covered at a speed of 43.2 miles per hour.

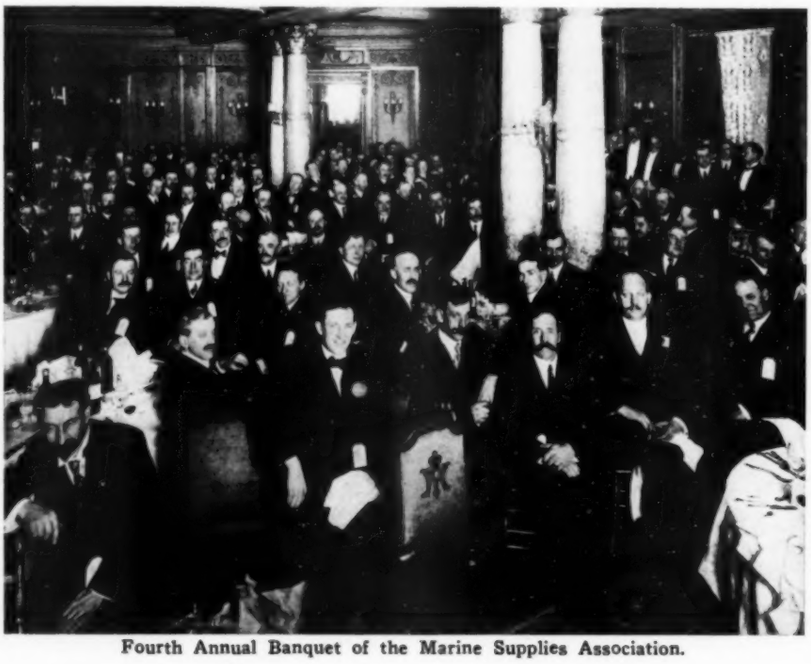
Oregon Wolf measures 39 ft. 5 ins. in length and has a waterline width of 4 ft. 8 ins. She is powered with a 300 h.p. Smalley 9-cylinder aluminum motor, equipped with three Mea magnetos, and has 6 sets of metal planes, running from 30 inches to 52 inches in length, and 4 sets of air cushions. She is owned by five business men of Portland, who have formed a controlling organization known as the Oregon Speed Boat Company. What interested the promoters of the craft particularly, was that by setting up a new record, they felt that the chances became more favorable for an international regatta to be held on the Pacific Coast during the Panama Exposition of 1915. In fact the directors of the fair, prior to the race, promised that if the Oregon Wolf passed the mark set by the Dixie IV, a $20,000 purse would be offered as a trophy. Wolff has been designing and building speed boats for about eight years and has turned out more than one successful craft in that time. On this occasion, he took charge of the motor, while Otto Mathiot, a young mechanic who has been associated with him, was at the wheel. Among the officials of the event were Mayor Allan G. Rushlight of Portland and Senator James Ambrose.

International Trophy Challenge Received.

It has been announced that the Royal Motor Yacht Club of Great Britain has sent a challenge to the Motor Boat Club of America for the British International Trophy. The challenge has been accepted and the date set is August 31st for the first race and September 2nd, Labor Day, for the second.

Supplies Association Holds Annual Dinner.

The fourth annual dinner of the Marine Supplies Association of America was held at the Hotel Marie Antoinette in New York City, February 21st, at 7:30 p.m. The dinner was preceded by the annual meeting of the association and the directors' meeting. At this time the following officers and directors were elected for the coming year: President, William W. Wilcox; vice-president, Chas. D. Durkee; treasurer, John Tiebout, and secretary, Arthur Falk. Mr. Falk will also act as counsel. In addition to the above officers, the following directors were chosen: John A. Carpenter, Geo. W. Campbell, John E. Fisher, Chas. Halyburton, Frank W. Merriman, John A. Porter, Frank Richard and James Walker. A special committee was appointed for increasing the scope and effective work of the department of collections and credits. The principal address of the evening on treaties and laws that had hastened the decline of the American merchant marine was delivered by Lewis Nixon, who was heard with great interest and frequently interrupted by cheers and applause. Among the other speakers were M. Franklin Ford, Joseph Wright, Miller Freeman and Jas. L. Ewell. After the speeches a vaudeville entertainment was offered. The entire occasion was marked by enthusiasm and good-fellowship.



Fourth Annual Banquet of the Marine Supplies Association.

The Baltimore Show.

A motor boat show will be held in Baltimore, Md., from April 3 to 13 under the auspices of the Prospect Park Racing and Maryland State Fair Association. The actual conduct of the exhibition will be in the hands of the Baltimore Marine Engine and Motor Boat Fair Association which has been organized for this purpose. The display will be held in the main building at Prospect Park within sight of the Back river and easily accessible from the city. The building affords about 25,000 square feet of floor space, giving ample accommodation for the 140 exhibitors who will have displays. A feature of the show will be a series of illustrated lectures on the handling and care of motor craft. If the weather is favorable, it is hoped to hold races on the river during the show period.

Death of H. P. Johnson.

We deeply regret to have to record the death of Mr. H. P. Johnson, a leading naval architect of the south and a valued contributor to MoToR BoatinG. While sailing on Lake Pontchartrain, La., in his yacht, the Sea Wolf, he was swept over the side by the boom when the boat jibed and was drowned before assistance could reach him.

Oregon Wolf and J. E. Wolff, her designer and builder. She has a 9-cylinder Smalley-Daniels engine, equipped with Mea Magnetos.

N. A. E. B. M. Elects Committeemen.

The National Association of Engine and Boat Manufacturers has appointed the following members of the executive committee, class of 1914: P. C. Jones, Henry R. Sutphen, John A. Murray and H. H. Brautigan.

"Practical Pointers for Boatmen" Correction.

In the article which appeared on page 32 of the March issue, entitled "Practical Pointers for Boatmen" there is found this statement: "Get into the habit of giving two horn signals when you turn to the right and one when you turn to the left in meeting other boats." This, of course, should be just the other way 'round, the "rule of the road" covering the case providing that when approaching another vessel head on, you should give *one* short blast of your whistle if you intend to turn to the right and *two* if you want to go to the left. We wish to acknowledge the kindness of the reader who brought this error to our attention. We don't want any inexperienced enthusiast to have reason to blame us if he gets drowned through following a wrong direction appearing in our columns.

Monitor Boat and Engine Company Now a Corporation.

The Monitor Boat and Engine Company of Newark, N. J., have recently incorporated their business with an authorized capital of $50,000 with a view to extending along the line of knock down boat frames and material. The officers of the new corporation are George H. Gere, president and manager; C. Devan Thomas, vice-president and treasurer, and M. T. Gere, secretary. The office and factory building is located at 215-17 Emmett street and 264-6 Wright street.

A Low-Priced Elbridge Model.

It's an ill wind that blows nobody any good and motor boating enthusiasts are going to benefit by the fact that an extra 0 which accidentally was added to an order for 100 crank shaft and connecting rod forgings, has led the Eldridge Engine Company of Rochester, N. Y., to bring out a new single cylinder "A" special engine at the remarkable price of $55.00. The material and workmanship is the same as in the regular $95.00 type "A" single cylinder, except that the cylinder head is enamelled instead of being nickel-plated and plain fittings have been substituted for brass. The engine has salt water equipment, bronze rotary pump, Bowen grease cups, Philadelphia timer, etc., and has a speed range up to 1200 r.p.m. A special circular has been issued describing this machine, which can be had by addressing the company.

A New Safety Starter for Runabouts.

The Lombard Mfg. Company, Rochester, N. Y., have added another type to their line of well known safety starters. It is a modification of their model D, is designed to be installed on a bulkhead and is especially suited for manufacturer of runabouts or autoboats. An effective little pump for power whistles designed to sell at $7.50, is another new product of the Lombard Company.

A Steering Pedestal-Binnacle.

The John E. Hand & Sons Company, of Baltimore and Philadelphia, are marketing a steering pedestal-binnacle which embodies some interesting features, among which may be mentioned a means for correcting semi-circular deviation of the compass. These pedestals are made in heights of 16 and 32 inches, with both trunnioned and hexagonal heads and in two models, the "Caliph" and the Octa." Pedestals are furnished in both these models without binnacles.

Knox Engine Builders Extend Plant.

Increasing business is the reason for the extension of the plant of the Camden Anchor-Rockland Machine Company, of Camden, Me. The old anchor shop which since the decline of the anchor business has been used for storage purposes, has now been converted into an up-to-date boat building shop, 140 x 60 ft. Two launching ways have been put in, large enough so that a 100 ft. boat can be built entirely under cover. The front of the wharf has been reconstructed and extended and a blacksmiths shop built just east of the machine shop. The old boat shop will be used for constructing small boats.

A Recent Addition to the Royal Family.

The Royal Engine Company, Bridgeport, Conn., have added a new single cylinder model developing 5 and 7 h.p. at 630 and 500 r.p.m. respectively to their line of marine motors. This engine has a bore of 5⅝ inches and a stroke of 6 inches in the 7 h.p. size and a 4⅝ in. x 5 in. cylinder in the 5 h.p. model. The lubrication is by a centrifugal ring oiler on the crank shaft. The lubricator feeds the oil into the ring whence it is forced to the bearing by centrifugal action through an oil channell drilled in the crank pin. The igniter is a single unit, removable by simply taking out the screws. An automatic float feed carbureter is used and the motor has a plunger pump and ball thrust bearings. The weight complete in the 5 h.p. size, is 220 lbs. and in the 7 h.p. size, 300 lbs. Other models made by the same company are the model F 2½ h.p. single cylinder and 5 h.p. double cylinder, and the model G 10 h.p and 15 h.p. double cylinder engine.

A Good Marine Glue.

Jeffery's No. 7 black, special canoe glue or waterproof liquid glue, made by L. W. Ferdinand & Company, 201 South Street, Boston, Mass., is good material to remember when applying canvas to decks and tops of cabins or when covering canvas boats and canoes. Marine glue is superior to white lead for this purpose as it permeates the canvas, rendering it waterproof and preserving it so that it will last for a long time. White lead is apt to rot the canvas and while it may shed water for a time, has not the permanent waterproof qualities that canvas laid in marine glue has been found to possess.

Anderson Advertisement Correction.

The Anderson Engine Company have desired us to note that in their March advertisements the sentence reading "during this our dull season we are executing a number of special orders at reduced prices" should have the word "expecting" in place of the word "executing."

Every Man His Own Engine Builder.

The Superior Machine & Engineering Company, Detroit, Mich., have a proposition which should appeal to the prospective motor boat owner of a mechanical turn of mind. They will furnish castings and forgings for two-cycle marine motors, together with drawings and full instructions for the operation of single and double cylinder motors from 4 to 18 h.p.. When the rough parts are machined and assembled by the purchaser, the result is a high grade marine engine at a very low cost. These engines were previously built and marketed as the Yale motors, hundreds of which are now in successful operation. The company is also bringing out a small air compressor for air whistle outfits.

Scripps Secures New York Agency.

The Bowler, Holmes & Hecker Company, 141 Liberty Street, New York City, have recently made arrangements with the Scripps Motor Company to sell the Scripps line of marine engines and will carry a full stock of these machines on the premises. The new agents are well known to motor boating public, having been in their present location for the past six years.

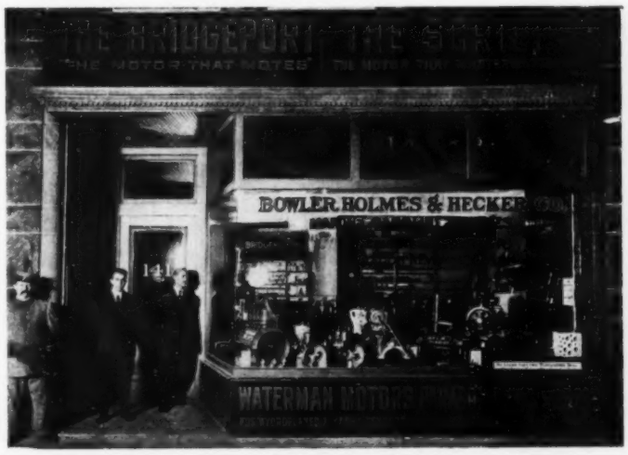
Kyanize Spar Finish.

The Boston Varnish Company, Everett Station, Boston, Mass., has put on the market a new spar finish known as "Kyanize" which has remarkable powers of resistance and can stand salt air without turning white. The fact that it has been used to a considerable extent by the United States Navy, should recommend it to owners of motor boats and the yachting public in general.

Weckler Company Building Fauber Hydroplanes.

The Weckler Boat Company of Chicago, Ill., have recently secured the right to build the well known Fauber patented hydroplanes. These boats are 26 ft. long and have a speed of 35 miles an hour. They are built of carefully selected Honduras mahogany, double planked construction with two white cedar decks, covered with silk laid in marine glue. The spark and throttle control levers are mounted on the 17-inch mahogany steering wheel and the reverse lever and switch are within easy reach of the operator. The motor is a 6-cylinder Van Blerck four-cycle machine, developing over 100 h.p., equipped with a Bosch high-tension magneto and having a direct-connected propeller shaft.

The propeller is a special pattern manganese bronze casting, highly polished and very thin. The boats are sold with complete equipment including power air whistle, polished brass running lights, cushions, etc. Notwithstanding the fact that they are racing boats, these craft have proved that they possess stability and safety in rough water as well. Pioneer, capable of making 42 miles an hour with 300 h.p., Disturber II and Red Top III, are famous speed boats of this type. W. H. Fauber has made arrangements to co-operate with the Weckler Company in placing the boats on the market and in the building of special hydroplane racers.



New Scripps agency, 141 Liberty Street, New York City.

The Prize Contest.

(*Continued from page 33.*)

But indoors, we stain all the first-story wood some dark brown or green and finish it without any gloss. Hemlock, you know, has an astonishingly attractive grain when so treated, and yellow pine is nearly as good. The low beams, the heavy side studs with their wide planking, and the knee-braces, all suggest the 'tween decks of some old-time clipper; the dark stain carries on this feeling.

But upstairs, where the rooms are smaller, the dark finish would be too oppressive, so we paint everything white except, of course, the floors.

In the Gulf States cypress may be used for most of the woodwork, but in the extreme West redwood will probably be the most satisfactory thing, especially as it needs no stain.

For a comparatively small building, such as this, a resident steward isn't absolutely necessary, usually someone living nearby can be engaged as janitor of janitress, coming in for a brief period each day to clean up and so on. However, if desired, one of the upstairs rooms will serve quite well as janitor's sleeping quarters. In a certain club that I have in mind a woman is always on hand during the afternoons (or on holidays) to sell sandwiches, hot coffee, etc., and she makes quite a neat little sum out of it. Often, doubtless, some person would be glad to serve as janitor in return for privileges of such sort.

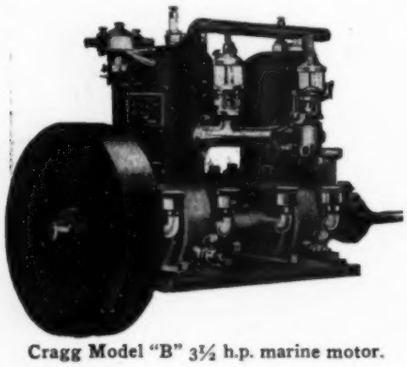
Yes, I was waiting for it; I knew you'd ask it: "How much will it cost us to build this?"

Easy enough to ask, but mighty hard to answer. The cost of building varies to an unbelievable degree in different parts of the country, fully a hundred per cent. this variation. For in some places good mechanics get 15 cents an hour, elsewhere they get 45, 60 and even $1 for the same time. And ordinary lumber is anywhere from $10 to $30 per thousand feet. However, let's take Philadelphia prices as the average, with hemlock at $23 and carpenters at 45 cents. Then this building would cost from $1,200 to $1,400; for there is about 500 square feet of floor area in the first story and an equal amount in the second—1,000 square feet. Now, the cost of building this sort of structure near Philadelphia is, approximately, $1.20 per square foot; $1.20 x 1,000=$1,200. But down the Chesapeake, or on the Gulf Coast, one could build for anywhere from $600 to $1,000, and so it goes.

Then what is one to do?

Just this: Take these pages to your local builder and get him to give you an approximate estimate on this, he can readily do it, for all the drawings are carefully made to scale. And then, if you want a larger or smaller building it's a mighty simple matter for you to figure out about how much more, or less, it will cost you proportionately.

But remember one thing, an attractive building properly designed by a competent architect, will not cost you one cent more than an utterly ugly, commonplace affair of the same size designed by an amateur. These amateur plans will cost you nothing, that's true, but in this world the things we get for nothing are usually worth just about that—or a little less.



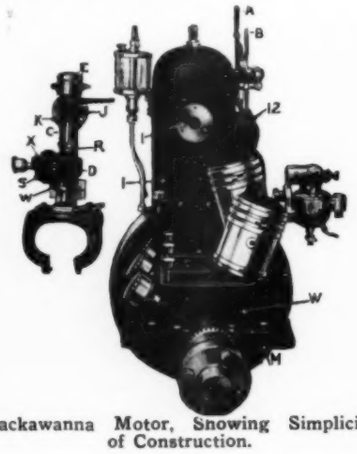
Cragg Model "B" 3½ h.p. marine motor.

Cragg Marine Motors.

The Gilmore-Cragg Motor Mfg. Company, Detroit, Mich., is putting out an interesting line of marine motors comprising eleven models in from 1 to 3 cylinders and developing all the way from 1½ to 36 h.p. Cragg motors are built on the 2-cycle principle, with 2 ports in the heavy-duty type and 3 ports for lighter service. Lubrication is by means of sight feed lubricators and the oil is fed into the motor with the gasoline. The main bearings have compression grease cups which require very little attention. The bearings are made of phosphor bronze and are interchangeable, and the same material is used for the plunger pump. The ignition is through a complete vibrating spark coil and switch mounted on the spark plug, without any secondary wiring. This system is water, heat, oil and foolproof and gives a hot spark with low battery consumption. By means of a special timer the motor can be reversed without stopping. When buying a Cragg motor the motor boatman does not buy an experiment and, furthermore, has the satisfaction of knowing that he is getting a fully equipped machine which does not need a lot of extras before it can be installed.

Lackawanna Improvements for 1912.

With their 1912 models, the Lackawanna Manufacturing Co., of 126 Liberty Street, New York City, have inaugurated a thorough system of standardization and simplification. The long experience which the makers of these two cycle motors have had, has enabled them to reduce the number of parts to a minimum. Furthermore, these improvements have been made standard on the entire Lackawanna line this season, so that the purchaser of any type or size will get the benefit of the efforts the company has put forth to make their product known as the motor that is "simple and self-contained." The accessibility of these engines is shown by the fact that by simply removing the six bolts securing the cylinder to its base, the whole interior of the cylinder is opened for inspection, although neither the engine shaft, bearings, timer, pump, flywheel nor foundation have been disturbed. The materials used all through the Lackawanna insure the owner against trouble from weakness in vital spots Cylinders are made of a special semi-steel mixture, cast in pairs with water jacket all around and heads integral. Pistons are of special Lackawanna design and the wrist pins are made of hard steel, hollowed to allow oil to pass to the connecting rod bearings, and held rigidly in place by double bolts. Connecting rods are of ordnance metal bronze, with high tensile steel studs and the crank shafts are forged from a special tough steel, rich in carbon. The composition bearing metal used in the main crank shaft bearings, has demonstrated its superiority by more than ten years' continual use. The thrust bearings are of the ball type. An absolutely automatic oiling system is used, which obtains lubrication by mixing oil with the gasoline. Other features of the equipment are the Herz Lackawanna type timer, Schebler carbureter with Lackawanna patented throttle control, waterproof spark plug hoods and a new style bronze pump driven direct from the main shaft by covered bronze gears. Lackawanna engines are made in ten different models, ranging from 1½ to 55 h.p., with from 1 to 6 cylinders.



Lackawanna Motor, Snowing Simplicity of Construction.

The Little Giant in the Motor Field.

A good many people already know the Evinrude detachable rowboat motor, made by the Evinrude Motor Company, of Milwaukee, Wis. Those who do not will be interested in the following facts concerning this rather unusual little machine. The Evinrude is a 1½ h.p. motor, operating on the two-cycle principle, with two ports, a 2½ x 2½-inch cylinder and a speed range of from 300 to 1,000 r.p.m., giving a maximum of eight miles an hour. An interesting point is the by-pass which, by means of a double system of ports, prevents the new fuel charge being wasted through the exhaust. Although primarily designed to eliminate rowing, it is a good emergency outfit for larger craft to have on hand.

A Dry Cell That Is Dry.

Chas. D. Durkee & Company, who handle marine accessories at 2 and 3 South Street, New York City, have a dry battery which has most appropriately been named the "Seapruf" because of its water-shedding qualities. This battery possesses all the features of a waterproof battery box at considerably less cost. The terminals are specially made so as to prevent wrong wiring up of the cells. Each cell is so constructed as to mechanically lock into the cell next to it, with no separate conductors to work or jar loose and no wiring needed. Last, but by no means least, these batteries are unaffected by water or dampness. Some of the other ignition specialties which bear the name of Durkee, are the new Durkee spark plugs with a patent terminal clamp, preventing loose wire connections, and a trouble detector; the Seapruf boat switch with trouble lamp attachment and the complete Seapruf ignition system, comprising a waterproof box containing batteries and coil and equipped with a patent switch and lock device, controlled by a plug key of special design.

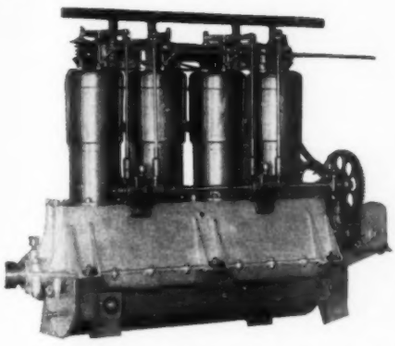
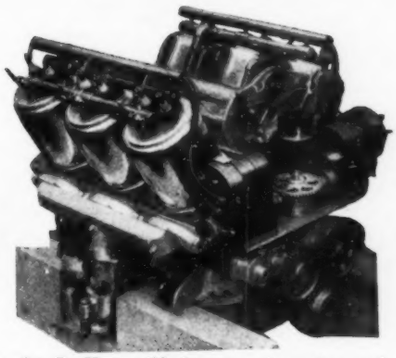
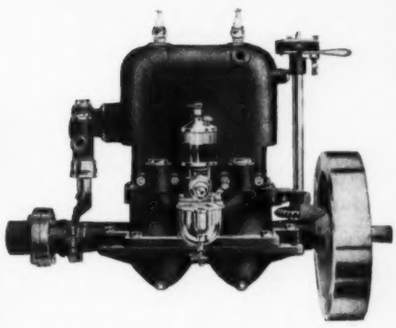
The Wisconsin Valveless Engine.

The Wisconsin Machinery & Mfg. Company, Milwaukee, Wis., are making a 2-cycle valveless marine motor in 8 different models, ranging in size from 5 h.p. to 60 h.p., and guaranteed against backfire or base explosions, regardless of speed and load. This feature is secured by employing a combination screen in the by-pass of the cylinder, through which the flame cannot pass to the base. A good example of this line is the model D, 15 h.p., 2-cylinder machine. This engine has a bore of 4¼ inches and a stroke of 4½ inches and develops its rated horsepower at 900 r.p.m. All moving parts except the flywheel are enclosed. The oiling system is direct and positive, the water circulation amply provided for and advanced ideas are apparent in the design and construction of the intake and exhaust manifolds. The front bearing is 5 inches long, the center bearing 3¼ inches long and the rear bearing 4 inches long. The motor complete weighs 400 lbs.

News of the Eagle Agencies.

The Eagle Company, Newark, N. J., builders of the Eagle marine engine, have announced a number of new agencies which have been established in various parts of the country. A branch office and warehouse has been opened in Seattle, Wash., where a large stock of engines will be carried to take care of Pacific Coast business and the export trade to Honolulu, the Hawaiian Islands and Australia. The California Coast business will be handled as heretofore by the Marine Engine & Supply Company, 121 East 6th street, Los Angeles. In Canada, the Shea Sales Company, 296 St. James street, Montreal, have been appointed exclusive agents for the province of Quebec and exhibited the Eagle line at the Montreal Motor Boat Show. Frederick W. Unger and John J. Mahon have recently formed a partner-

Lackawanna Equipped for U. S. Navy.

An engine trio—the H-DeK racing machine, the R. V. modified two-cycle motor and one of the Lockwood-Ash two-cylinders.

ship and established an Eagle agency at 119-21 East York street, Baltimore, Md. Besides the Eagle they will represent the Sterling Engine Company, of Buffalo, N. Y. The Eagle Company has just issued its new 1912 catalogue which is characterized by simplicity of arrangement allowing the prospective customer to sum up at a glance the specifications of the different models, together with the price and equipment. The equipment furnished with these motors, as given in the catalogue, is unusually complete, including Schebler carbureter, Hyde manganese bronze propeller, patented water-cooled silencer, etc.

A Timer With Several Advantages.

The Perfex current alternating timer, made by the Electric Goods Mfg. Company, Canton, Mass., has a number of real advantages for marine work. It reverses the direction of the current at every revolution of the timer shaft; feeding first a positive and then a negative current to the vibrator, it absolutely prevents deposits of platinum from forming on the vibrator points and overcomes the pitting and sticking of the points, assuring a good, clean contact. The essentials of the device are two arms insulated from each other, which are attached to the timer shaft, one connected with the zinc and the other with the carbon terminal of the battery group. As the shaft revolves, the arms alternately feed the positive and negative current to the vibrator points. The outfit can be used on any jump-spark engine, either two or four-cycle, and is attached to the timer shaft in the same manner as the ordinary timer.

A Good Propeller for Auxiliaries.

The Thompson automatic feathering propeller, made by the Noyes Machine Company, South Portland, Me., is designed especially for the auxiliary yacht, fishing vessel and motor tender. It is fastened on the shaft with a key and nut in the same manner as a solid wheel, and need be given no further attention when once attached. When the engine turns ahead, the blades swing into forward position; when the engine is reversed, the blades reverse and back, and at all times when the motor is at a standstill, the blades are feather-edged to the water. This propeller is made in nine different sizes of hub, each with three or more different diameters of blades. The blades can be changed without removing the hub from the shaft, which means that when a blade is accidently broken it can be replaced without buying an entirely new wheel.

Engine Company Changes Name.

The Phillips Gasoline & Kerosene Engine Co., 218 North Jefferson Street, Chicago, Ill., announce that they have taken over the business of the Phillips Gasoline Engine & Motor Co.

Wisconsin Engine Changes Boston Agency.

W. W. Meek, 108 Broad Street, Boston, Mass., has again taken on the line of marine motors made by the Wisconsin Machinery & Manufacturing Co., Milwaukee, Wis.

Should Be H. M. Crane.

In the February advertisement of the Sterling Engine Co., it was stated that Clinton H. Crane was the designer of the engines of the Dixie IV. This was an error, as the credit belongs to Henry M. Crane, his brother. Clinton H. Crane designed the Dixie's hull.

New Carbureter Wrinkle On Vim Motor.

The Vim Motor Company, Sandusky, Ohio, are exploiting a new wrinkle in connection with the Kingston floating ball carbureter used on their marine engines. This carbureter has but one adjustment, a gasoline needle valve, and with the new device the needle point adjustment, when once made, is automatically controlled by the throttle so that the proper mixture is distributed to the cylinders at any speed of the motor. The details of the device include a lever which is clamped to the gasoline needle valve and connected with the throttle lever so that the opening and closing of the throttle automatically changes the adjustment of the needle point, giving the same mixture of gas and air at varying speeds. The air is controlled automatically by a number of floating balls. This eliminates the use of a spring-actuated valve heretofore found necessary in connection with the air intake.

The Ontario Two Cycle Engine.

The Ontario marine motor, made by the Ontario Iron Works, Pulaski, N. Y., is a two-cycle three-port valveless machine, which has stood the test of six years of successful service in motor boat work. These engines are made in 3 h.p., 6 h.p., 9 h.p. and 12 h.p. sizes, with one, two, three and four cylinders, 3½-inch bore and stroke, and 7 h.p., 14 h.p., 21 h.p. and 28 h.p. sizes with from one to four cylinders, 5 x 5-inch bore and stroke. The water circulation is obtained by means of a shaft-driven gear pump and the timer is operated by gears from the flywheel. The carbureter has been designed especially for engines of this type and has fully proved its superior qualities. Ontario motors have been refined and simplified until they approach a high point of mechanical excellence. In addition they are offered at a moderate price, which is no small recommendation.

Something New In Plug Coils.

The Connecticut Telephone & Electric Company, Inc., Meriden, Conn., have placed on the market a combined spark coil and plug for marine work, although it is also suitable for any form of jump-spark engine. The vital points of the device are so thoroughly protected that no amount of water will affect its operation. A gun metal finished brass cap completely covers the windings and core and housed under it is the company's standard type vibrator, which has proved its efficiency by several years actual use. The secondary windings of the coil have more than double the resistance of the ordinary coil used for marine work. There are only two primary wires, one from the battery to the coil itself and another, a very short one, from the coil to the timer. When desired, this coil can be supplied attached to a switch with a removable lever, giving a combination which is often desirable. The price with the switch is $5.50 and $5 without.

Toppan Boats Now Handled in New York.

Probst-Greiff Company, 50 Church Street, have taken the agency for the Toppan Boat Mfg. Company and will have on display representatives of the Toppan line of motor boats at their yard in Bayonne, N. J. The fact that the new agents have a yard is of especial interest to prospective buyers, as boats can be delivered in the water, running, when desired —a great convenience to buyers not familiar with marine engines, since they can learn in this way how to operate their motors. The Toppan Company reports very encouraging results from the New York and Boston shows and a good beginning of the selling season.

Some Interesting Ignition Statistics.

Of the 316 engines exhibited in boats and on stands at the recent New York show, 139 were equipped with a magneto, 67 employed battery systems and the balance were without any distinctive form of ignition. The Bosch system was used by 70.5% of the motors equipped with the magneto. The increase over last year in motors using the magneto for ignition is 34, the increase for the Bosch type being 12%. The nearest approach to the Bosch percentage in 1911 by another system was 15.2% and that was reduced this year to 10%.

Ball Reverse Gear Improved for 1912.

The New York Gear Works, of Brooklyn, N. Y., have made a number of improvements in the Ball reverse gear manufactured by them for 1912. One of these is the use of roller fingers, which enables the operator to throw in the cone with moderate pressure, taking the strain off the brake band. This is an advantage over the solid finger type furnished with many other models. The Bali gear is made for motors of from 3 to 150 h.p. at prices on stock sizes ranging from $20 to $70. A number of contracts have been closed with engine builders in this country and abroad and it is expected that the coming year will be a busy one. To meet this the plant has been improved and now the company are prepared to ship single orders the same day they are received.

The R. V. Modified Two Cycle Motor.

The Raymond Engineering Company, Inc., 53 State Street, Boston, Mass., are offering a modified type of two-cycle motor, an illustration of which will be found on this page. The motor is a six-cylinder machine with a 5-inch bore and stroke. It develops 75 h.p. at 1,000 r.p.m. and 90 h.p. at 1,200 r.p.m. The net weight of the motor is 270 lbs., and with the complete duplicate equipment as shown in the illustration, 345 lbs.

An Improved Cushion Button Fastener.

The R. L. Kenyon Company, Waukesha, Wis., is now making a patented cushion button fastener known as the "Monel Metal Wire Fastener," which is a great improvement over the ordinary twine fastener. The new device is similar to the long metal clip used in offices to fasten papers together. It extends through the cushion from the eye of one button to the eye of the corresponding button on the other side, preventing the buttons from becoming loose or tearing off, even under strenuous conditions. Motor boat owners will appreciate the troubles eliminated by this device.

Sterling Engine Company Expanding.

The Sterling Engine Company, of Buffalo, N. Y., has been forced to put on two shifts of workmen to make deliveries on time. In addition to the night force, the company has also secured the factory formerly occupied by the Phelps Auto Top Company at 1243-5 Niagara Street, and converted it into a test room for their high-power heavy-duty motors.

New Life in Western Launch & Engine Company.

The Western Launch & Engine Works, Michigan City, Ind., has been reorganized and is expected to become an even more important figure than before in the boat industry. Dr. F. R. Warren will act as president, A. R. Leland is general manager and H. L. Rea, for eight years manager of the Columbus Safe Deposit Vaults in Chicago, has taken the treasurership S. C. Miller, of St. Joseph, Mich., formerly with the Truscott Boat Company, is the company's designer and will handle the boat end of the business. It is planned to limit the output to two stock models, a 20 and 25-footer of the auto boat pattern. An option on this company was secured by the National Boat & Engine Company some time ago but this was, of course, terminated by the failure of the latter concern.

The A. W. C. Hydro-Runabout.

The Atkin-Wheeler Company, of Huntington, Long Island, are offering a handy little speed craft in lengths of 14 and 20 feet. The 14-footer is comparatively inexpensive and is

small and light enough to be carried on the davits of a 50-foot cruiser. She has 4 feet of beam, seats 2 persons amidships and weighs complete 870 lbs. The power plant is a 30 h.p., 3-cylinder, 2-cycle motor, giving a guaranteed speed of 25 miles an hour. The boat sells at $925. The 20-foot size is a real racing boat, having a speed of 38 miles an hour, absolutely guaranteed. The hull has an elm frame and is mahogany planked, with 2 watertight bulkheads. The entire control is at the wheel and the details are worked out with a view to the craft being handled just as a car is ashore. The power plant is an 8-cylinder A. W. C. motor, developing 90 h.p. at 1,200 r.p.m. The cylinders are 4½ x 6-inch, cast en bloc. B. K. F. radial ball bearings are used on crank and camshaft. The motor has Bosch dual ignition, Stromberg carbureter and force-feed lubrication through crankshaft, with the splash system for cylinders. An excellent type of air starter saves cranking. The boat weighs 1,475 lbs. complete and sells for $4,500. The company also designs and builds motor boats of all sizes and types and does all kinds of machine work.

Safe Starting.

The Auto Safety Crank Company, Holyoke, Mass., is marketing a new form of motor starting crank made by B. F. Perkins & Son, Inc. With this device the effort required for cranking is reduced to a minimum and perfect safety from back-kicks is assured. The essentials of the device are a stand on which a crank and sprocket are mounted attached by a chain to a sprocket on the engine shaft. The outfit is so constructed that when a back-kick comes the sprockets and chain are driven backward with full force but the crank handle remains stationary in the hand of the operator. When the engine starts running forward, the lower sprocket disengages and remains stationary. The system can be applied to any size or style of engine, and if desired the stand can be done away with by mounting the crank and upper sprocket directly on the bulkhead.

"Winners."

Edward Smith & Company, Long Island City, N. Y., makers of varnish and enamels for marine work, have issued their 1912 edition of "Winners.' This is a fat little booklet containing a record of the names of the winning yachts and their owners for the racing season of 1911. The boats are grouped by clubs so that they can be readily referred to. The book is a reference work of real value and will certainly be appreciated by motor boat owners all over the country. Incidentally it will serve to remind them that Smith's spar coating, a durable varnish for exposed wood and metal work, and Smith's quick marine coating for hurried work anywhere and for all wood and metal generally awash, are good things to remember whether one is in the racing game or not.

The H-DeK Racing Engine.

A new motor for aeroplanes and other aeronautical purposes, and of interest also to racing motor boat builders, built along standard lines yet showing no little originality and strength of design, is seen in the H.-DeK. motor. It is a steel-cylindered 4-cycle water-cooled machine, 5 3/16-inch bore and 6-inch stroke, 60-80 horsepower and weighs but 240 pounds without equipment. The motor has considerably more power than an automobile motor of the same dimensions, owing to the freedom of the exhaust which is directly into the air through a newly-designed form of exhaust valve cage, and to the use of auxiliary holes below the water-jackets. The use of integral steel cylinders, specially tempered with the overhead valves seating directly on the cylinder-head, are features of the motor. The water-jackets are of copper, readily removable, and the oiling system is splash and force feed. Special oil troughs are provided so that whatever angle the motor may take in flight, the bearings will be plentifully supplied irrespective of the force feed system. The motor is equipped with the Mea magneto, Stewart carbureter, Pederson oil pump and Charavay propeller of the latest type. The makers are Hopkins & DeKilduchevsky, of 1531-37 Broadway, New York.

A Marine Speed Indicator.

The American Steam Gauge & Valve Manufacturing Co., of Boston, Mass., have fallen in line with the trend that is causing the adaptation of motor car devices for motor boat use and have brought out a speedometer for marine work that will in all probability outbid the regulation log, at any rate in the smaller types of power craft. The instrument was designed by Prof. F. B. Sanborn, a man of thorough technical training and ability, who has worked the idea out by dint of two years' practical experimentation. The device operates by direct pressure of the water, which is forced through a tube in which suitable connections to the instrument are installed, by the forward movement of the boat. Protection against possible obstruction has been carefully thought out and is provided by a triangular plate extending in front of the inlet tube. To further guard against this possibility, a cleaning wire with an adjustable handle is introduced into the tube which can be forced through the inlet when desired, clearing it of mud or other obstructions. An interesting feature is that the spaces on the dial are equal. On the older types of marine speedometers, the inability to overcome the varying water pressures at different speeds made this impossible.

A Good Line of Marine Plumbing.

The line of marine plumbing and specialties made by A. B. Sands & Son Co., of 22-24 Vesey street, New York City, has been known to yachtsmen for over sixty years and to motor boatmen ever since the sport grew to the cruiser size. Popularity brings business and that is why the Sands list of yacht fixtures has had some recent additions. Chief among these is the "Improved Mohawk" pump water closet, of extra heavy construction throughout, with a large, oval, vitro adamant flushing rim, hopper bowl, fitted with a powerful, easy-acting three-inch pump, which discharges the contents through a rear outlet. It is especially recommended for the owner's or guests' cabin. A companion piece to the "Improved Mohawk," is the "Hebron" lavatory, made throughout of vitro adamant ware and so constructed that it can be fitted with either a pump taking water from a tank under the lavatory, or a combination faucet for hot and cold water supplied by a pressure system. Another interesting new device is known as the "Auto Force Marine Air Pump," designed to pump out gasoline fumes from around the engine and foul air from the galley or cabin. It is made of galvanized iron, polished brass or copper and is constructed so that it draws the bad air out instead of forcing air down into the compartment, as in the cowl type of ventilator.

The Cape Cod Sportsman's Fishing Boat.

The Cape Cod Power Dory Company, Wareham, Mass., have a new model for the coming season in the "sportsman's fishing boat" designed by Gurney and intended for use on fishing trips although it makes a very good little craft for general use. The boat measures 16 ft. overall and has 4 ft. 10 in. beam. It is cedar planked, has a flat bottom, with a total draft under the stern of about 12 inches and about 4 inches draft forward and will seat eight people comfortably without in the least overloading. The boat can be fitted with either a Palmer or Ferro motor, installed in a cross seat a little aft of midships. The top of the motor is covered with a strong metal hood protecting it from the weather, and the batteries and coils are placed under the seat so that no wires or pipes are exposed. The forward seat is boxed in to form a fish well and the after seat is also boxed, making a very convenient locker. A Roper propeller is used placed well aft to facilitate clearing from weeds. The boat complete costs $250.

Varnish Remover Patent Upheld.

United States Patent No. 714,880, owned by the Chadeloid Chemical Company of New York City and covering paint and varnish removers, was upheld by Judge Veeder of the United States District Court for the Eastern District of New York, in a decision rendered February 8th. The case in question was a suit instituted by the Chadeloid Company against the Daxe Varnish Company.

Making the Boat Safe.

The Aaron Automatic Bilge Pump, made by the Aaron Automatic Bilge Pump Company, Providence, R. I., has somewhat the same place in a motor boat that a safety valve has on a steam boiler. It is a good deal better to prevent a fire in the first place than to put it out after it occurs and the mission of the Aaron Automatic is prevention. It can be installed on any type of engine and works at any pressure from 3½ to 30 lbs. While the engine runs, the device pumps the water and gasoline fumes from the bottom of the boat. The pump is connected to the outlet of the circulation discharge of the cooling system. Then a pipe is run from the pressure regulator valve on the pump to the former point of discharge into the exhaust pipe, manifold or muffler, as the case may be. While the Aaron is designed chiefly to remove dangerous gases from the bilge, it also improves the working of the engine and prevents distortion of cylinders and pistons and all parts exposed to heat by reducing the circulation water to a uniform temperature, certainly a most desirable feature. Made in three sizes, ranging in price from $25.00 to $85.00. Larger sizes are made to order.

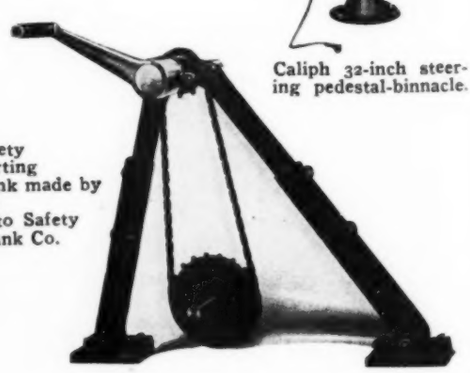
Lombard safety starter mounted on bulkhead

Mechanical Devices Co.'s combination shaft log.

New electric boat light made by the W. A. Fenner Co.

Safety starting crank made by the Auto Safety Crank Co.

Caliph 32-inch steering pedestal-binnacle.



MOTOR BOATING ADVERTISING INDEX

THE MOTOR BOATING MARKET PLACE

The rate for "For Sale" and "Want" advertisements is 3 cents per word. If an illustration is used the charge is as follows, which includes the making of the cut:
Cut one inch deep, one column wide..... $2
Cut 1½ ins. deep, 1½ column wide..... $3
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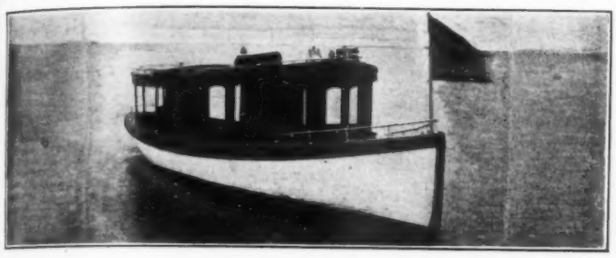
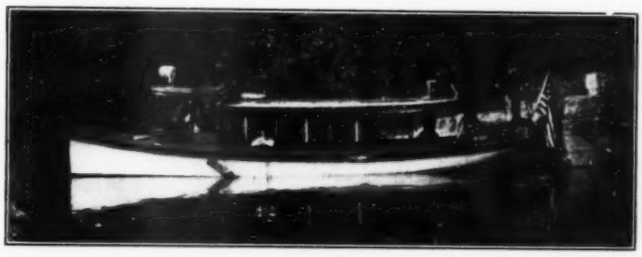
Opportunities for the Motor Boatman

Before you buy or before you sell examine the exceptional buying and selling opportunities under this heading. They comprise the best offers of the month. Please mention Motor Boating.



ATTRACTIVE CABIN CRUISER, 36 x 8 ft.; copper riveted; fine sea boat; 21 H. P. 3 cylinder 2 cycle Kahlenberg engine; battery and magneto; starts automatically without cranking. Reversible engine; friction clutch; golden oak paneled cabin. Sand's closet and folding wash stand; leather cushions, brass lights, etc. Fully equipped and in perfect condition; copper fuel tank of 250 gallons; speed 10 miles per hour. Could not duplicate boat for $3,000. Now in Sturgeon Bay, Wis. Delivered within reasonable distance for $1,400. F. J. Cabot, 6995 Washington Ave., St. Louis, Mo.

A COMFORTABLE BOAT at a reasonable price. For river and lake use no type is so pleasurable as the full cabin launch. Full head room in the pilot house, and two comfortable seats with unobstructed view ahead even in the worst weather. Absolutely reliable engine which will run all day without attention. Boat can be seen at Morris Heights. Robert L. Niles, 20 Broad Street, New York.



No. 6610—For Sale—Auxiliary centerboard yawl, 30 ft. w.l., length 34 ft. o.a., beam 12 ft., draught 3 ft. Roomy cabin with four berths. Self-bailing cockpit; Star steering gear with mahogany wheel. Sails new last year. Victor Fairbanks 4 H. P. engine, speed under power 6 miles. Apple dynamo, run from flywheel, can be used for ignition and electric light, for which cabin is wired and fixtures in place. A thoroughly seaworthy craft in good condition, having been housed every Winter. Price $800. Inspectable near New York. Address Yawl, 262 Water St., New York City.

HIGH SPEED RUNABOUT FOR SALE: 40 ft. x 3 ft. 9 in., cork pine planking, mahogany trim, 90 H. P. four cycle motor. In commission only six weeks. Niagara Motor Boat Co., North Tonawanda, N. Y.

MAHOGANY BOAT FOR SALE

Solid mahogany. Length 28 ft. Beam, 5 ft, 6 in. Draft 20 in. 10 H. P. Vim motor.

Motor and boat in perfect condition. 3 yrs. old, used only 2 summers. To be sold at a low figure to close an estate.

Address, Box 427, NORTHAMPTON, MASS.

Dealers—Attention!

R. E. DIETZ COMPANY

are closing out their entire stock of

Marine Lamps

and are offering them at bare FACTORY COST. SOLID BRASS—FITTED WITH CORNING FRESNELS. An exceptional opportunity to buy high grade lamps at money making prices.

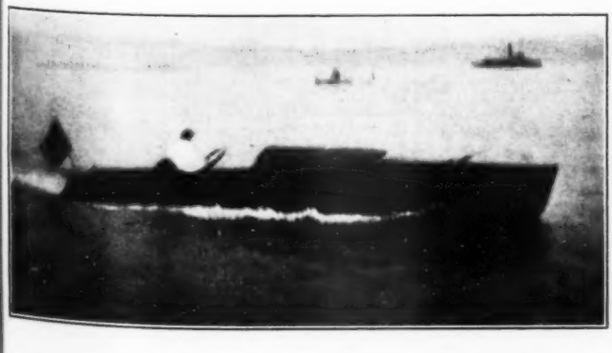
60 LAIGHT STREET NEW YORK CITY

REAL BARGAINS.

Speed boat hull, Sand-Burr II model, but larger, 26 by 6 ft., all of mahogany, copper riveted, highly finished, built last year for very prominent person for racing, accommodates 8 persons. Will sell as fast runabout. Price $400. Sand-Burr I, in perfect condition, accommodates 8 persons, equipped with 4 cyl., 4 cycle, 20 H. P. Buick engine, speed 22 miles, sells as runabout. Price $600.

Caroline I, Ocean City prominent racing boat, in good condition, accommodates 8 persons, speed 18 miles. Price $400. Adolph E. Apel, Designer and Builder of Sand-Burr II, Ventnor, Atlantic City, N. J.

FOR SALE: A 12-in. electric searchlight (deck type) and 6-60 storage battery, both new, never used. Cost over $50. $30 takes both. Light alone, $20. J. L. Judkins, 27 Chatham St., Worcester, Mass.



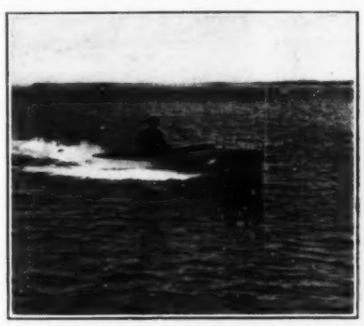
No. 6534—For Sale—Speed runabout Billiken II. 25 x 4 ft.; speed 18 miles per hour; automobile control. Hull, double-planked cedar, canvas between; copper fastened throughout; mahogany deck and fittings; metal hood over engine. Engine, 3-cylinder, 19-23 h. p. Vim. Atwater-Kent ignition, Lavigne mechanical oiler, Paragon clutch, rear starter. Complete set of tools, wicker chair for aft cockpit, Janney-Steimetz 25-gal. pressed steel tinned tank, Hyde 3-blade propeller, Columbian self-aligning strut, bronze 1¼-in. shaft. This is a beautifully built boat and should be seen to be appreciated. Low price, as owner goes abroad this June. Can be seen in New York City by appointment with K. S. Lamb, 360 West 22d Street, New York City.

Third Annual Magneto Bargain Sale

Imported High Tension Magnetos at Less than Cost of Importation

Our third annual genuine inventory sale of U. & H. Master Magnetos, made in Germany, is now in progress. All H.P. sizes and types for 1, 2, 4 and 6-cylinder motors, suitable for motor cars, motor wagons, motor boats, motor cycles, stationary engines, etc. Write now, before they are all gone, for circular and price list. The sale is a real Magneto money saver.

J. S. BRETZ COMPANY
250 West 54th Street, New York



FOR SALE: New fast runabout, 20' x 4-2". Handsomest boat of her size. Cedar and mahogany; 3 cylinder, two cycle engine, with rear starter—controls at steering wheel. Speed 15 real miles—$750. Speak quick. Milton Boat Works, Rye, N. Y.

AUTO MARINE ENGINES FOR SALE.

25-50 H. P. New, 4 cyl., 4 cycle.....$345
25-55 H. P. Used, 4 cyl., 4 cycle.....$320
20-40 H. P. New, 4 cyl., 4 cycle.....$285
25-50 H. P. Used, 4 cyl., 4 cycle.....$225
12-25 H. P. Used, 4 cyl., 4 cycle.....$170

Motors are complete with all accessories, including reverse gear and magneto and are ready to run. Will ship on approval. Bill Ferguson, 210 Jefferson St., Waterloo, Ia.

AHOY! A BARGAIN!

Beautiful auxiliary sloop yacht "Zanth" for sale, 31 x 11 x 4 ft., with 5 H. P. Palmer Engine. Lead ballasted keel, no centreboard. Separate galley contains two-hole blue flame stove, refrigerator with capacity for 200 lbs. of ice, lockers for provisions, etc., and large storage locker for anchor chains, etc. Complete cruising outfit of cooking utensils, dishes, glassware, linen and silver. Cabin sleeps six comfortably and is finished in mahogany with two wardrobes and chiffonier. Boat is in sound condition and is unusually seaworthy and steady under sail. Have good sails, new last June, 1911. Every convenience on board for comfort. Water tanks and regulation yacht toilet. Large space under cockpit for storage, with trap door. Full headroom in cabin. Spars and rigging in good condition. This yacht and entire equipment will be sold to a quick cash buyer for $550.00.

Yacht may be seen at any time at Ruddock's, 214th St. and Harlem River, New York City. Take Broadway Subway to 215th St., walk one block, or address owner, J. T. McNAIER, 23 Murray St., New York City. Phone, 5900 Barclay.

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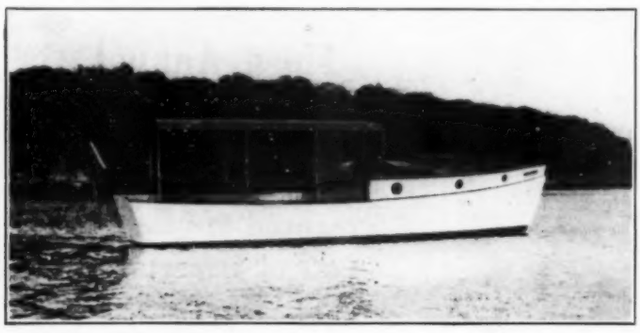
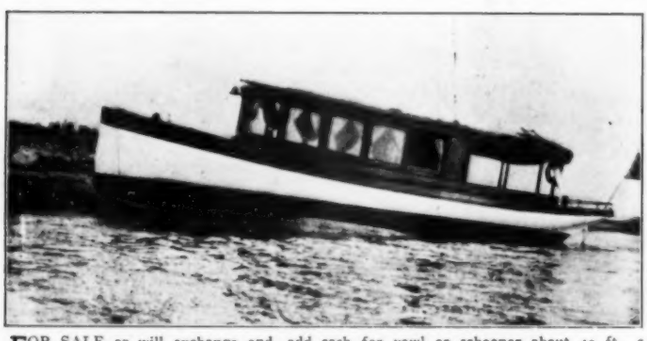
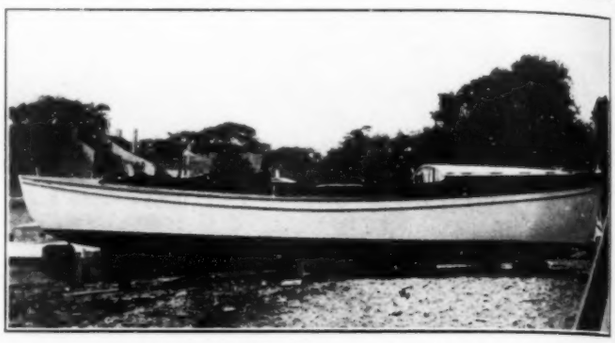
Before you buy or before you sell, examine the exceptional buying and selling opportunities under this heading. They comprise the best offers of the month. Please mention MoToR BoatinG.



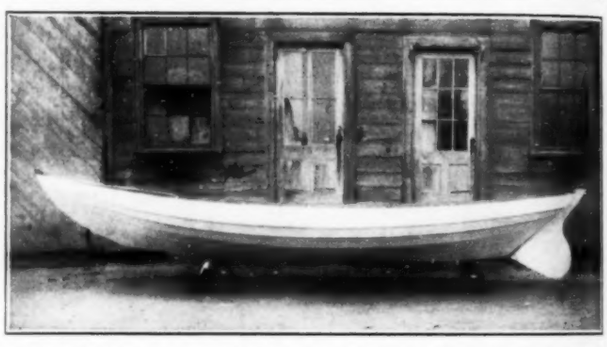
No. 6531.—For Sale—Raised deck cruiser, 28.6 x 7.6 x 2.6 feet. Fully equipped; 15 H. P. motor and high-tension magneto. May be seen within an hour's ride of the city. For further particulars apply, J. W. Straub, 23 Front Street, N. Y. City.



FOR SALE or will exchange and add cash for yawl or schooner about 40 ft., 3 ft. draft. With or without power. Standard engine preferred. Launch 30 x 7.6 x 3 ft. Built by Gas Engine and Power Co. Copper fastened and finished throughout in mahogany. Toilet, folding basin, running water, icebox, copper tanks, complete inventory, all lights copper, compass, bell, etc. Two bronze propellers (one two-bladed weedless). Latest Standard engine in perfect condition, absolutely dependable. Boat has good freeboard and is very able. Price $950. Inspectable at Marine Basin Co., foot Hubbard St., Ulmer Park, N. Y. Address Tracy Grey, 117 Warren St., N. Y. City.



BONNEY WHALEBOAT.—John and Anna; 31 ft. x 7½ x 3; 11 ft. cabin. A sea-going launch with a $700 16 h.p. 4-cycle motor. A beautiful and staunch boat. Engine run one season; full equipment with new 11 ft. tender, $1,050. Send for circular of Bonney auxiliary whaleboats and 31 ft. full head room low cabin cruiser. John C. G. Bonney, 21 Platt St., New York.



BONNEY DORY.—19 ft. x 5½ ft. beam x 1 ft. draft. Finest sea-going boat of this size afloat. Price $100 equipped for motor or with sails. Decked forward. 18 ft. dories complete, sailing rig or fitted for motor, $75. 16 ft. x 5 ft. sailing dory, $50. Send for circular. John C. G. Bonney, 21 Platt St., New York.

IF you have had trouble in keeping your engine running or if you are contemplating buying a new machine it would be well to learn something about it at the Motor Boat School of the West Side Y. M. C. A., 318 West 57th St. Classes day or evening. Send for Booklet "BB."

FOR SALE at reasonable price, one 300 H. P. six cylinder single acting reversible Standard engine. Has been in use one year and better than new. Reason for sale, am manufacturer of marine motors and am changing Standard for my own make. Also have one Standard lighting outfit in A1 shape. Will sell both together or separately as purchaser may require.
W. E. SCRIPPS,
SCRIPPS MOTOR CO.,
631 Lincoln Ave., Detroit, Mich.

FOR SALE: 42-ft. raised deck cruiser, launched last July; one 30-footer, launched in 1909; one 30-footer, launched last June. These boats are in first-class order and are fitted with 4-cycle engines. Palmer Brothers, Cos Cob, Conn.

FOR SALE.
New Marine Engines at Bargain Prices.
3 1½ H. P. "Liberty" motors, new $28.20
6 2½ H. P. "Liberty" motors, new 31.80
4 3½ H. P. "Liberty" motors, new 37.80
4 6½ H. P. "Liberty" motors, rebuilt 50.00
Also all sizes of Strelinger and Little Giant motors.
All motors we sell are at *Bargain* prices direct to the user. No commission allowed to agents. All motors guaranteed satisfactory and as represented or your money back. Repairs for all the above engines. Gas Engine Brokerage Company, 248 Canfield, West, Detroit, Mich.

NEW FOUR-CYLINDER Milwaukee "Imperial" motor, 45 H. P., 4¾ in. bore, 5¼ in. stroke. Price $235; one two-cylinder "Wall," water cooled, upright motor, 8 H. P., price $60. Automobile Appliance Co., 1712 Michigan Ave., Chicago, Ill.

FOR SALE: 4 cylinder, 2 cycle, 20 H. P. second-hand marine motor, $100; 10 and 16 H. P. 2 cylinder, 2 cycle, new, with all accessories, $125, $150. George Brochu, 25 Cabot St., Holyoke, Mass.

HANDSOME 35 x 9 shallow draft cruiser houseboat, white oak and cypress built, 6½ headroom, fully equipped, sleeps five, 25 feet natural finished cabin, launched September, 1911. Cost $1,650, goes $1,000. In New Orleans. Regal heavy duty engine. Speed 8 miles. Address A. B., care Motor Boating.

MAGNIFICENT SUMMER RESIDENCE on Cayuga Lake, N. Y., for sale. Will accept in part payment motor boat. Photographs, price and terms on request. Dr. Zacharie, 39 Court St., White Plains, N. Y.

NEW 54 H. P., six-cylinder Elbridge engine, just from factory. Aluminum manifolds, base and cylinder heads, extra finish throughout. Built for Mr. Coleman du Pont of Wilmington, Del.; exchanged for a larger power. Price $700. Emerson Engine Co., Alexandria, Va.

FOR SALE, CABIN CRUISER.
57 feet long, 9 ft. beam; Barber 40 H. P. engine, 1 man control; fully equipped and well designed. Apply to builder, Fitz M. Hunt, Alexandria Bay, St. Lawrence River, New York.

A BARGAIN: Two 4 cylinder, 2 cycle, 50 H.P. Gasoline Engines, complete from Propeller to Fly Wheel, in excellent condition. Fitted with Bosch Magnetos, Lavigne Oilers, Heinz Coils, Reverse Gears, etc. Set up ready for inspection. Owner purchased larger engines. Will sell one or both. Price $375.00 each, F. O. B. Detroit, Mich. Apply C. W. Kotcher, 639 Gratiot Ave., Detroit, Mich.

BROKEN cylinders and other automobile parts of cast iron and aluminum made good as new by autogenous welding at about one-fourth cost of new ones. Shipment made within 24 hours from arrival. Guarantee, references and indisputable evidence for the asking. Waterbury Welding Works, Waterbury, Conn.

FOR SALE—18 x 4½ runabout, 2 cycle, 2 cylinder engine, 6 to 7 H. P., 11 to 12 miles, auto top, everything complete. This is a first-class outfit and commands everyone's admiration. Will repaint and varnish and refinish complete. Write for price at once. Albert L. Lutz, 129 S. 3rd St., Burlington, Iowa.

50 ft. x 12 ft. BRIDGE DECK CRUISER FOR SALE CHEAP. Has been used only six weeks. Owner purchasing larger boat. Niagara Motor Boat Co., North Tonawanda, N. Y.

FOR SALE.—Racine Built Boat 18' 9" x 4' 6". Installed new last August a 7 H. P. 2 cylinder 2 cycle Fairbanks-Morse engine with Baldridge gear. Full equipment. No reasonable offer refused. R. G. Light, Ottawa, Ill.

EXCELLENT sea boat, 18 x 5, ready to launch, $250. Was built for sample show boat. Excellent workmanship, designed for tender for steam yacht. Davit rings, oak frame, cedar planking, mahogany trimmings, copper fastened, 2 lazy backs, towing bitts, cork-filled cushions, 1911 2 cyl., 6 H. P. Palmer engine, jump spark, used six weeks, 16 gal. copper tank, all trimmings brass and bronze. Cost new, $600. Have bought large cruiser. E. B. Somerby, Winthrop, Mass.

SCORED cylinders repaired, $12 each. No enlargement of bore—no need for new pistons and rings. Send piston with cylinder. Absolutely reliable method. Better investigate and save money. References, testimonials and full details on request. Waterbury Welding Company, Waterbury Conn.

CANADIANS, Second-hand engine bargains. Send for list. Guarantee Motor Company, 73 Bay Street, North, Hamilton, Ont., Canada.

FOR SALE AND CHARTER—Sail and motor boats of all types, suitable for the Great South Bay. Frank M. Weeks, 272 River Ave., Patchogue, L. I.

BARGAINS in Palmer motors, factory rebuilt and guaranteed. E. E. Palmer, 31 East 21st St., City.

USE "SNAPPER" ENGINES for your small boats. They are a big little engine built by The Automatic Machine Co., Bridgeport, Conn.

FOR SALE.—4 cyl., 4 cyc., 20 H. P. Marine Engine. Price $60, f. o. b. cars. R. H. Bartholomew, 1920 James Ave. So., Minneapolis, Minn.

1911 two cylinder Fox Motor 3½ x 3½, with clutch and complete equipment; used 3 months. First-class condition. $97.00. Paul Kittel, 3714 Humboldt Ave., Chicago, Ill.

WANT to correspond with boat builder that understands marine engines. Will give half interest in business to run this resort. Must be reliable and sober. E. Gullot, Helena, Mont.

NEW UNIVERSAL JOINT at a Bargain. Never been used. Worth $9; must go for $4.50. Bill Ferguson, 210 Jefferson St., Waterloo, Iowa.

1000 guaranteed pocket ammeters for testing batteries. Handsomely nickelplated. Each instrument in a chamois leather case, 25c postpaid. Stamps taken. Auto Repair Co., 521-23 West 144th St., New York.

FOR SALE: Open mahogany launch, built by Seabury, 30 x 6.8. Speedway motor, 16-20. Deck and trim mahogany. Splendid bargain for one desiring family boat. J. D. C., MoToR BoatinG.

NEW GUARANTEED STORAGE BATTERIES—6-60 at $7.25; 6-140 at $20. For Ignition and Lighting of Motor Boats. Walter W. Hartman, Quincy, Ill.

FOR SALE—27 foot, raised deck cruiser, built 1910. Complete equipment; toilet, electric lights, tender, etc.; everything. Cash offer for immediate sale. F. M. Barnes, Jr., Station L, Washington, D. C.

FOR SALE.—One new 36 H. P. Model T Gray Motor, 1/3 less than cost. Never been installed. O. D. Collins, Snow Hill, Md.

Among the Clubs.

(*Continued from page* 31.)

The Chesapeake Bay Yacht Racing Association will hold its annual meeting at Baltimore on April 13th, at which time the date will be set for the annual cruise and races. It is expected that the meeting this year will be of unusual importance since, in addition to the presence of the officers and executive committee, a special call will be issued to the commodores of the seven clubs that make up the organization. The probable itinerary of the cruise will be to meet at Cambridge, race there two days, race to Oxford, race there two days, race to Baltimore and race there. All classes of motor and sailing craft will be included in the speed contests and, besides the regular events for members of the association, there will be races open to all visiting craft.

The Baltimore Yacht Club has begun work upon its new quarters on Locust Point, adjoining historic Fort McHenry. The club house will be erected upon the end of a hundred-foot pier and will be one of the handsomest structures in the South, and the grounds leading to the pier will be turned into gardens. It is hoped to have the building and grounds ready by the latter part of May when the club will go into commission.

The Maryland Motor Boat Club of Baltimore, will go in for an active racing campaign this summer. The first event will be held on June 29th when the fleet will be sent over a 200-mile course from the club house 100 miles down the Chesapeake to Point No Point and return. There will be three classes, for boats over 50 feet, 40 to 50 feet and under 40 feet, and to the winner in each class will be presented a loving cup valued at $100 as a trophy.

The Cambridge Yacht Club of Cambridge, Md., though one of the youngest of the Chesapeake Bay organizations, will conduct an active racing campaign during the coming season and expects to hold a water carnival in which racing by the swiftest motor boats in the country will be the leading feature. Commodore Alfred I. DuPont will contribute a speed boat which is now being constructed by the builder of Sand Burr II. This boat will be sent to all of the large race meets in the country and will fly the colors of the Cambridge club. Messrs. White, of Atlantic City, will send Sand Burr II, equipped with a new and more powerful engine than she had last year. Peter V. Hoy has promised his new boat, T. Coleman DuPont will enter a boat that is credited with a speed of 40 miles, there will be a new racer which is now being built for James Busic, of Cambridge, and there is a possibility that Wm. K. Vanderbilt may have a boat to enter. The racing committee, which has appointed March 7th and of which James Smith is the chairman, will put a man on the road this spring to call upon motor boatmen throughout the country and request their entries for the carnival. As a result of the offer of Commodore DuPont to present a 60 h.p. Barber motor to the club member building the hull in which the engine makes the best speed, there are now four boats under way and a fifth in prospect. The tryouts of these craft will be held as soon as they are ready. Each boat will be equipped with the engine and with the same propeller and, while it will require several weeks to determine which craft is the speediest, the clubmen are looking forward to the event with much interest. Each boat, of course, is being built with all the secrecy that the nature of the contest requires. About $3,000 will be spent this season in various improvements to the club property. One of these will be the erection of a large dancing pavilion and the water front will be made more convenient by new landing stages, etc.

The Delaware River Club, Philadelphia, Pa., has arranged for a very interesting series of races this season. At least six and possibly seven of the members are working on a fleet of 22-foot, one-design, V-bottom speed boats which are expected to make close to 20 miles per hour. Several of these craft are under construction at the club house and every week-end witnesses an enthusiastic crowd assembled to watch the progress of the work.

Motor Boating in Germany.

The German Motor Boat Club at the close of last year had a squadron of about 97 craft, all but 35 of which measured 10 meters (33 feet) or over. The club is primarily for owners who do not care to undergo the bother and strain inseparable from racing, but prefer to cruise about quietly, with fellow clubmen, or alone. The club headquarters are located in Berlin.

Yard and Shop.

(*Continued from page 56.*)

A Popular Racing Propeller.

The Hyde Turbine type propeller has had a rise in popular estimation that is quite remarkable, considering the short time it has been before the boating public. Two years ago it was practically unknown, while at the present time it has proved its efficiency on many of the well-known speed boats on the Atlantic coast and elsewhere. A few of these might be mentioned, such as the T & S, which won the Palm Beach Grand Prize race, the Kitsix, the Scylla, winner of the race from Middletown, Conn., to Huntington, L. I.; the Caroline, winner of the Halifax race; the Victor, which made a record-breaking trip from Norfolk to Richmond, Va., and return, as well as the Guess Not and the famous Dixie IV, winner of the 1911 International Trophy race. Hyde propellers are made of manganese bronze and their large blade area gives them their speed qualities, as well as making them superior for towing. The Hyde propeller is manufactured by the Hyde Windlass Company, of Bath, Me.

New Carbureter Agents.

The Findeisen & Kropf Mfg. Company, of Chicago, Ill., have announced that they have secured the Hall Motor Supplies Company, of Toronto, Canada, as distributors of the Rayfield carbureter and have also added to their list of agents the R. C. Hull Electric Company, of Cleveland, Ohio.

Spark Plugs for Gasoline Engine Ignition.

The Auto Specialties Mfg. Company, Milwaukee, Wis., is offering a very comprehensive line of spark plugs in two models and a number of different types. The "Meteor" is especially designed for use with the magneto and gives a very intense spark, due to the barrel end construction and is an ideal plug for use with engines of high power. The "Ajax" spark plug is a standard form of two-point plug which does clean and effective work and is simple and practical in construction. The mica cores used in both these models are manufactured by the Auto Specialties Company and the double insulating feature prevents oil from penetrating the core and causing short-circuits. A terminal clip of special design makes positive contact.

Henricks' Improved Magnetos.

When the Henricks Novelty Co., of Indianapolis, Ind., designed their "Comet" magneto they introduced something new in the shape of slip-end bearings, a patented feature by means of which the bushing can be replaced when it wears away without interfering with the alignment of the machine and without the removal of any part except the armature. Remove two screws from the back end bearing, pull the armature and slip the new bushing in and the trick is done. This is one advantage which the "Comet" possesses and it has a number of others. It is the result of fifteen years' experience in building and experimenting with magnetos. It delivers a uniform spark under all conditions. It is light and compact. The type "LC," a combination model for jump-spark and make-and-break ignition, measures 4 x 5½ x 9 inches and weighs only 10 pounds. The base, bearing, magnet and pole piece support are all cast in one piece and the number of parts has been reduced as far as possible right through the magneto. Besides the "Comet," the Henricks Company builds the type "J," a friction governor, direct-current machine for high-speed, jump-spark engines, the type "S" standard three-magnet for make-and-break ignition, and the "Eureka" D. C. jump-spark machine, designed to spark any number of cylinders.

The Granite State Two-Cycle Engine.

H. F. Clifford, of Concord, N. H., is making a 2-cycle 3-port gasoline engine in 2 sizes, which he has appropriately named the "Granite State" motor. The cylinders are 5 x 5 inches and the single-cylinder model will develop 8 h.p. when running from 600 to 700 r.p.m. The water pump is of the plunger type with a large bore and short stroke and the other equipment includes a standard reverse gear, Eureka 2-cycle special carbureter and the American timer and coil. Fitted with the carbureter, grease and oil cups and aluminum base this engine weighs only 180 lbs. The 2-cylinder model, equipped in the same way with both manifolds of aluminum, weighs 280 lbs. An important feature of this engine is the drop-

(*Continued on page 78.*)

Yard and Shop.

(*Continued from page 76.*)

forged crankshaft, made by J. H. Williams & Co. This is machined so as to act as a perfect thrust bearing which will allow much wear of the bearings without affecting the compression. The "Granite State" is sold at prices ranging from $138.50 to $325, depending on the number of cylinders and equipment.

Fogg Cushions and Awnings.

M. W. Fogg, of 202 Front street, New York City, has been making awnings, cushions, mattresses, pillows and general upholstery for yachts and motor boats since 1845, so naturally, with such long experience, he knows something about this rather important branch of outfitting. Fogg's specialty is contract work for boats of the larger type and, as most of his work is done to order, he does not issue any catalogues or other literature describing his product. Still he is a good man to remember whether it is only cushions for a 20-footer or a complete outfit for a power yacht.

The Ferro Photographic Contest.

The photographic contest, recently held by the Ferro Machine & Foundry Company, of Cleveland, Ohio, brought a response that was literally overwhelming. Scores of photographs poured in from all quarters of the globe, picturing every type of craft from the canoe to the raised deck cruiser. The first prize was awarded to "Mifrances," A. Frank Jones, New York City. This boat is a flush-cabin cruiser, 34 ft. 8 ins. over all and 9 ft. beam, equipped with a 25 h.p. Ferro engine. The prize was a 3 h.p. Ferro motor and outfit valued at $100. The second prize was entitled, "Never Meddle with a Good Engine Daddy," and was won by M. Hazledine, of Terre Haute, Ind. The prize was a $55 Bosch magneto. A photograph of a navy sailing launch powered with a 15 h.p. Ferro engine and belonging to one of the warships of the North Atlantic fleet, which was contributed by F. B. Knowle, of New York City, carried off the third prize, a Ferro reverse gear, valued at $28. An interesting fact disclosed by the contest was the keen interest taken in motor boating by people in all walks of life. Photographs were received from New Zealand, China, the Philippine Islands, Sweden, South Africa, Alaska, Cuba and every state in the Union which boasted an expanse of water large enough to make motor boating a possibility

The Start-Lite Starter.

The Start-Lite Starter, made by the Start-Lite Company, 1502 Michigan avenue, Chicago, Ill., is a valuable addition to the number of devices designed to remove one of the greatest bugbears of gasoline engine operation. The Start-Lite operates on compressed air, rotating the motor through expansion, and is entirely independent of the carbureter or ignition system. The principal feature of the outfit is the "compressor-distributer" unit, consisting of a four-cylinder air compressor of large capacity with a multiple cam-operated valve distributer mounted integrally. This is mounted on the engine base in such a position that it can be geared to the magneto shaft, cam or main crankshaft to insure timing with the engine. To operate, a foot-button is pressed which opens the master valve, permitting air to flow through a tube to the distributer and at the same time opening the cylinder inlet valves. The air passes through the distributer to the cylinders in the order of their firing, thus running the engine on compressed air until it picks up its own power. After the pressure in the storage tank has been lowered by the operation of starting, it is automatically raised again to a predetermined point by the compressor. The same company also manufactures a device for lighting, regulating and extinguishing gas lights.

The Daisy Electric Gas Lighter.

While acetylene gas has come to be recognized as one of the successful mediums for obtaining illumination, the question of lighting the lamps, especially when they are located in places not readily accessible, has always been a problem. This problem the Simkin Mfg. Company, of Chicago, Ill., claims to have overcome with its "Daisy" electric lighting system. The entire mechanism of this device is contained in a brass case and the current is furnished by the magneto or other ignition system of the motor. A needle cut-out valve admitting or shuts off the gas gas from the valve, a similar valve between the cut-off and the lamps for regulating the volume of gas, and a plunger switch, cut in on one of the high-tension wires to the

(*Continued on page 80.*)

The greatest and most instructive book on marine gasoline engines ever published ——

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FREE TO YOU

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A HISTORY of the internal-combustion engine from earliest times to the present day.

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The Ferro Machine & Foundry Co., 39 East Hubbard Ave., Cleveland

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Cleveland

Gentlemen: Please send me copy of your 1912 Treatise-Catalog.

Name _____

Address _____

Yard and Shop.

(Continued from page 78)

spark-plug, by which the igniting current is delivered to the lamp burners, comprises the controlling system. In operation the gas is turned on by means of the cut-out valve and the switch plug is pressed in, causing a series of sparks to flash across the lamp burners igniting the gas. The outfit complete is priced at $10.

Death of Edgar Dey.

Members of the motor boating fraternity, in the vicinity of Ottawa, Canada, will regret to learn of the death of Edgar Dey on February 13th, at Halifax, N. S. He was an enthusiastic devotee of the sport and did much to improve its status in the region about Ottawa. His death was the result of injuries sustained in a game of hockey at Halifax.

Obermayer Cane Fenders.

The Obermayer Company, Inc., 42 Broadway, New York City, is producing a fender made of woven Spanish cane, covered by patents both in this country and abroad, which has been adopted by the U. S. Navy and the army transport service, as well as by the German and other foreign navies. These fenders are superior in many respects to the old rope fender. They are light in weight, have great elasticity and resiliency, are not affected by water, heat or ice, have long life combined with low initial cost, can be handled much more quickly and with less effort than a rope fender and float while a rope fender sinks. They are made in a number of sizes and types for varying requirements. Type No. 1 is a large fender for heavy service, measures 40 inches in length by 32 in diameter and weighs 176 pounds; type No. 5 is a long or hanging fender and is made in three sizes, running from 7½ to 13½ inches in diameter. Besides these types, there is a bow fender in three sizes and a round hand fender, measuring from 13½ to 24 inches in diameter and running in weight from 15 to 44 pounds. The Obermayer fender is handled by O. C. Kanzow & Company, 42 Broadway, New York City.

The Trebert Piston Valve.

Mr. Trebert, the designer of the H. L. F. Trebert Engine Works of Rochester, N. Y., has recently brought out a new valve for gasoline engines, which he has designated as the "piston valve" from the fact that it is shaped like a piston, except that it has a solid instead of a hollow base. In Mr. Trebert's invention, one valve performs both the intake and exhaust functions in each cylinder. About the center of the valve, slots are cut through its cylindrical sleeves, about the size of the intake opening to the main cylinders on either side of the valve cylinder. When the main piston is in the right position for a charge of gas to be admitted to the cylinder, the piston valve lifts so that the slots across it are level with the intake on either side, and the gas enters the engine. The valve then drops a little, following the cam, and cuts off the intake and exhaust, allowing compression and firing. Dropping still lower, it allows the exhaust to shoot over its top, and then raises cutting off the exhaust, the intake opens and the process is repeated. Among the advantages of this scheme, may be mentioned the fact that there is little possibility of carbonization, noiselessness, heating from the exhaust reduced to a small amount, and elimination of valve grinding. The company intends to market a four-cylinder 40 h.p. and a six-cylinder 60 h.p. vertical type in the near future.

The Buffalo at Montreal.

The Buffalo Gasolene Motor Company, of Buffalo, N. Y., had a large and attractive display at the recent show held at Montreal, Canada. Representative models of all the high speed, regular and heavy duty engines, which make up the Buffalo line, were shown. A 3 h.p. 2-cylinder, 3 x 4 inch, the smallest engine built at the Buffalo plant, was displayed and a 10 h.p., with a few refinements for this season. The "auto marine" racing engine was exhibited in both the 40 and 45 h.p. models. In these engines, the bottom base is extended back to enclose the clutch. A racing engine of higher power was seen in the 60 h.p. Buffalo, with four cylinders. The heavy duty type was represented by the new 9 h.p., four-cylinder, 5 x 6½ inch engine. The Buffalo line was exhibited by the Canadian Motor & Supplies Company, Ltd., 107 Inspector Street.

(Continued on page 82)

Yard and Shop.

(*Continued from page* 80.)

"Grooming" or "Tuning" Marine Engines.

The Anderson Engine Company, which has its factory at Shelbyville, Ill., and its main office at 160 North Fifth avenue, Chicago, makes use of the word "grooming" to describe the process of putting an engine in condition instead of "tuning," claiming that the former word more accurately describes the operation. W. C. Anderson, the manager, says that the difference between "grooming" and "tuning" is the difference between efficiency and service. Service may be good or bad, but efficiency must be efficient, and a carefully groomed engine is an efficient engine. The response from foreign countries to the company's advertising of their "specially groomed" engines has been very flattering and shipments have been made to Brazil, Australia and Denmark, as well as Canada and Alaska.

Automatic Shaft Alignment.

Not a few motor boatmen have found that their bearings unaccountably grind out and that their shaft becomes badly cut without apparently sufficient reason. If the reader is one of these, he will be interested in the automatic aligning shaft bearings which the Mechanical Devices Company, Inc., of Watervliet, N. Y., is putting on the market. These bearings allow for the natural distortion of the hull when driven through the water and by eliminating all binding of the shaft, not only save power but undue wear as well. Besides the bearings, the company makes flexible shaft couplings and universal joints, pipe joints, clutches, exhausts, etc.

Something New in Trouble Lamps.

The W. A. Fenner Company, Providence, R. I., has turned out something new in the way of a portable electric light for motor boats. It is 3¼ inches long, with a fiber shell and nickel trimmings and the light is furnished by an 8-candle-power, 6-volt bulb. The outfit is supplied with 8 to 10 feet of cord. It is the kind of a device that a fore-sighted man congratulates himself on having been wise enough to procure when he starts out to look for a gasoline leak after sundown.

New Agents for Havoline Oil.

The Havoline Oil Company, 17 Battery Place, New York City, announces the appointment of the following agents: W. A. B. Worley, of Jacksonville, for the Florida territory; Augusta Overland Motor Car Company, of Augusta, Ga., for the territory included in Lincoln, Columbia, Richmond, Warren, Jefferson, Glasscock, Washington and Jenkins counties, Ga., and Edgefield, Aiken and Barnwell counties in South Carolina; the Euclid Oil Company, 1906 Euclid Avenue, Cleveland, Ohio, for the territory included in northeastern Ohio, Cleveland, Akron and Youngstown and the James Gray Kunn Co., 5712 Penn Avenue, Pittsburg, Pa.

A New Yacht Agency.

Henry H. Jennings and Herman Jagle, who have been for the past twenty years associated with the late Manning's Yacht Agency, have announced that they will continue the yacht brokerage business under the name of the Jennings Yacht Brokerage Company, 17 Battery Place, New York City.

The Oxford Marine Engine.

The Oxford type C marine motor, made by the I. D. Robbins Company, 156 Broad Street, Lynn, Mass., has been designed with the idea of combining the efficiency and economy of the four-cycle engine with the simplicity, reliability and ease of operation of the standard two-cycle type. It has a number of points which should recommend it to the motor boating public, among which may be mentioned the superior oiling system which does away with a lubricator and its troubles and, as there is absolutely no opening from the crankcase to the explosion chamber, permits every moving part to run fully immersed in oil, an entirely separate method of ignition, high initial and terminal compression resulting in increased power, a speed range of from 200 to 1,200 revolutions without backfiring, economy and accessibility. These engines are made in sizes of from one to six cylinders. The Robbins Company has also designed the Oxford reverse gear to go with the Oxford motor. This gear employs a powerful disc clutch running in oil, which locks the driving and the driven shafts solidly together with no strain on the gear teeth.

Running the Coasts.

(Continued from page 8.)

eral use one of these charts is very misleading. The meridians, which should meet at the poles, are drawn parallel throughout so much of their length as the construction permits to appear on the chart. The parallels of latitude are represented as straight lines parallel to the equator and also, like it, perpendicular to the meridians. The scale of latitude and distance at either side, instead of being constant for the whole area, increases with the latitude until at the poles it becomes infinite. Hence, in making measurements of distances, the nearest latitude scale must always be used. But in projecting and developing the earth's surface by this method the entire globe, except the extreme polar regions, may be represented on a single sheet of paper, and the result is altogether remarkable considering the earth as we know it.

But, since on a Mercator's projection the meridians are everywhere equidistant from each other and the degrees of longitude are everywhere made equal to their lengths along the equator, it is necessary in order to preserve the relation between latitude lengths and longitude lengths to increase the length of a degree of the former in the same proportion as the projection distorts the length of the latter. On account of the preservation of this ratio throughout the projected area the shapes of the objects delineated are always correct; not so their relative sizes, however; so that what represents a square mile at or near the equator becomes a mere fraction in a high latitude.

Large scale charts may be treated as Mercator projections where the difference in longitude between the points cruised is not great enough to make their north points nod toward each other too much. The best practical test of this is the simple process running the parallel rulers from the meridian at one place to the meridian of the other and note whether or not the parallel ruler still points north and south. If there is any material difference it will be well to lay the course between these two places in sections, so that the ship's track will appear something of a curve. Were a Mercator chart used, no such difficulty would be experienced. Of the various sources of information used in running the coasts of the United States, the large scaled polyconic charts of the Coast Survey in conjunction with the tide tables and the United States Coast Pilot constitute an ideally complete outfit.

* * *

TRADE LITERATURE

The Carlyle-Johnson Machine Co., Manchester, Conn. Descriptive price list of the Johnson Marine Reverse Gear. The details of this compact and powerful encased type gear are fully illustrated by large cuts.

Valentine & Company, New York City. "Valspar as a Household Varnish." Tells how this product, originally intended as a purely marine varnish, has been extended to uses on land.

Riggs & Brother, 310 Market Street, Philadelphia, Pa. "A Nautical Almanac," for 1912 and the first three months of 1913. A useful booklet containing besides the almanac, many bits of useful information for navigators, especially around Delaware Bay and River. In addition, the comprehensive line of nautical instruments carried by Riggs & Brother is fully described.

C. F. Splitdorf, New York City. "A Record of Accomplishment." A resumé of performances of gasoline engines both on land and sea, equipped with Splitdorf magnetos, in various competitions.

The English & Mersick Company, New Haven, Conn. Special catalogue of door locks and door hinges. Describes also interior electric lights.

Buffalo Gasolene Motor Company, Buffalo, N. Y. "The Buffalo Book." A handsome catalogue of Buffalo engines, lavishly illustrated with photographs of vessels of all types on which these motors are in use.

The Baldridge Gear Company, Detroit, Mich. Catalogue of Baldridge Reverse Gears, giving tables of dimensions, ratings and prices, also details of the mechanical construction of the gear.

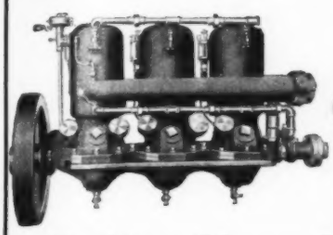
Automatic Machine Company, Bridgeport, Conn. Catalogue of "Automatic" gasoline engines for all classes of service, including many testimonials from owners.

The Remington Oil Engine Company, Stamford, Conn. Bulletin of marine and stationary oil engines.

The Scripps Motor Company, Detroit, Mich. "Scripps Reliability," telling the story of the trip that Captain Klaus Larsen made through the Niagara Whirlpool Rapids last fall and the story of the Scripps Reliability Cruise held last year under the auspices of the Great Lakes Power Boat League. Illustrated with many cuts.

Frazer Bros. Company, Adams, N. Y. Catalogue of Frazer-Adams Two-Cycle Marine Engines. Describing the line of 2 and 4 h. p. single cylinder, 4 and 8 h. p. double cylinder and 6 and 12 h. p. three cylinder motors made by the company.

Gray Motor Company, Detroit, Mich. Catalogue of Gray Marine Motors. A comprehensive and well-arranged descriptive list of this line of marine motors, taking up the various points of construction in great detail. A few pages in the back are devoted to questions and answers, where replies are given to the many questions frequently asked in correspondence about Gray motors.



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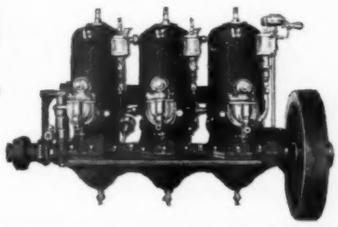

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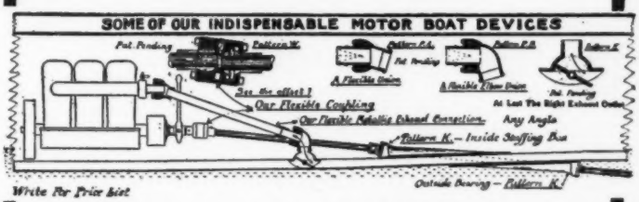

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THE DEAN MFG. CO., 221 FRONT ST., NEWPORT, KY.

The Illumination of Motor Boats.

(*Continued from page 26.*)

in use at the present time, nearly all of them embodying the same essential features, a generator, reverse current cutout and storage battery. Generators for this service are compact, as light as is compatible with proper efficiency and do not require a large amount of power (1/20 to ¼ h.p.) while batteries are charging.

Generators are driven in a number of ways, probably the most satisfactory being by silent chain. The larger number, however, are driven by friction pulley or by belt from the engine flywheel.

The regulation of generators is accomplished in various ways, by mechanical means or by electrical means, or a combination of both. The generators of some systems are not regulated for voltage at all, relying upon the cushioning effect of the storage batteries floated on the line. A well regulated generator will furnish current throughout a wide range of speed values without causing an excessive rise in voltage. The principal function of the generator is to keep the battery charged and when this has been accomplished it may be run "light" and only a negligible amount of power absorbed from the engine.

A storage battery is floated directly across the line and furnishes current for the lamps when the engine is not running or is at a speed too low for the generator to be in circuit. A reverse current cutout is placed between the generator and battery to prevent the battery from discharging back through the generator when, due to slowing down of the engine, its voltage falls below that of the battery. Storage batteries used are chiefly 6 volt, 60, 85 and 120 ampere hour capacities, although some 12 volt systems are in use.

The successful operation of all of these systems depends primarily upon the incandescent lamp used. Carbon lamps are impracticable for the service because of their inefficiency. The Mazda lamps developed for this service burn at an efficiency of approximately 1 watt per candle, being three or four times as efficient as the carbon lamp for the same service, thus permitting a smaller generating system. The light given by these lamps is of an almost pure white color and their life under service conditions is entirely satisfactory. The headlight lamp is built with a compactly coiled filament increasing the efficiency of the reflector by being practically a point source of light. These lamps are based regularly with the Edison candelabra base and also with the Ediswan candelabra base. This last variety is coming into almost universal use for motor boat lighting as vibration will not loosen the lamp in the socket, as the base is held by a bayonet lock device. Edison miniature bases are not recommended for this service, as they are too small to stand rough treatment.

Sixteen to 25 candlepower lamps are recommended for searchlights and 6 candlepower lamps for running lights. Cabin lights may be of six or ten candlepower according to the number of lights desired and the size of cabin to be illuminated. Fixtures especially designed to meet motor boat lighting requirements are readily obtainable at low cost.

The wiring installed is of greater importance than it is generally thought to be. The low voltage of these systems necessitates a rather large current in conductors and a small voltage drop will reduce the amount of light obtainable to a considerable degree. The cable used should be of the best quality, thoroughly waterproof and strong mechanically, as it is subject to a number of trying service conditions. No. 10 or No. 8 cable should be used from generator to battery and from battery to the outlet box. Searchlights should be wired with No. 10, while running lamps may be wired with No. 12 or No. 14. It is generally poor economy to install smaller wire.

The attendance required by a lighting system as described is of small consequence, as all that is necessary is an inspection and oiling of the generator and renewal of the battery electrolyte three or four times a season.

White Oak Best for Framing.

IN the selection of woods for boat building purposes, locality is often quite a prominent factor. It is natural that builders should select such woods as are easily obtainable near their yards, for not only are they obviously less expensive than varieties that are not native, but a greater opportunity is afforded for the choice of the highest grades of stock in suitable sizes and lengths for the particular work in hand.

Along the Middle and North Atlantic seaboard of the United States, where a majority of the high class boat building plants are located, a certain standard specification has gradually come to be recognized as indicative of "thoroughbred" boat quality. Clear white oak is used for the strength members including the keel, stem and stern posts, timbers, shaft log, engine foundations, deadwoods, shear strakes, covering boards, king planks, towing and mooring bitts. Georgia pine is used where members of considerable strength and long unbroken lengths are required, as for clamps, bilge stringers, fender strakes and the like. White cedar is generally chosen for planking where any attempt at lightness of construction is to be made. Georgia pine, white pine and cypress are also sometimes employed, while for boats of the highest quality where expense is hardly considered planking of teak, Spanish cedar or mahogany is specified.

Mahogany is considered the best wood obtainable for deck trim and also for interior finish, being not only rich and pleasing in appearance but possessing the qualities of durability, ease in working and considerable strength. It does not blacken when exposed to the weather, as does oak, but rather improves in appearance with age and is easily kept in condition.

White pine is unsurpassed for inside finish when treated with white enamel to assist in making a light and cheerful interior, mahogany trim often being combined with the white with excellent results.

To take up the qualities of the best known boat building woods in detail, we find that nothing can take the place of oak for frames. Live oak is probably the most durable and tenacious variety, but it is not often used nowadays, since it is scarce, and is not much handled commercially. The northern white oak is the choice of most designers, and is excellent material, being easily bent when made pliable in the steam box, possessing very great strength and holding its fastenings in an admirable manner. Pasture oak is considered superior to woodland timber, and Connecticut white oak is considered by many to be the most desirable boat lumber cut in any state. Red oak is plentiful and cheap in many localities but is distinctly inferior to white oak. So-called "Western" white oak is not highly esteemed by Eastern builders.

The planking is of equal importance to the timbers in the construction of a seaworthy, durable and generally satisfactory hull. White cedar is light, strong enough and is obtainable in fairly long lengths with few knots. Such knots as do occur are usually small and firm in the wood. As planking white cedar stands alternate wetting and drying without rotting or excessive shrinking or swelling. It is very light, but is also very absorbent, gaining weight rapidly when submerged, and hence it should always be kept well painted. Cypress is a somewhat similar wood, but is hard to keep smooth on account of its peculiar grain, is less durable and hence, while cheaper, it is not so well liked as cedar. White pine makes good planking material, but is now scarce and clear stock is relatively expensive. It is durable, not so absorbent as cedar or cypress, is easily worked and smooths up to a perfect surface. It dents easily if roughly used.

Georgia pine is probably the best planking material available for heavy boats. It is very strong, can be had in long, clear lengths and withstands hard knocks without injury. Owing to its pitchy nature it resists the action of

(*Continued on page 90.*)

water remarkably well, increasing but little in weight after long periods of submersion. Its one drawback is its tendency to shrink excessively when dry, thus opening the seams to an annoying extent. Narrow strakes should be used when planking a boat with this material. Georgia pine is a heavy wood and so is unsuited to speed hulls.

East India teak is unsurpassed for planking, being very strong and durable and it makes a very handsome appearance when finished "bright." Its color is a dark, soft brown with a handsome grain. Water has practically no effect upon it. Its considerable weight is its only drawback, unless we consider its high initial cost as such, but it is not expensive "in the end," since it will easily last a lifetime. It is the only wood that may be called teredo-proof.

Mahogany planking is in every way excellent, but, like teak, it is expensive, and hence is rarely used except on yacht tenders and speed boats of the most expensive construction. It resembles teak in appearance but has a certain warmth of color which is lacking in teak.

White pine is best for decks and cockpit floors and Georgia pine for bulkheads. Spruce is unexcelled for small masts and spars. Deckhouses and rails are oftenest of mahogany.

Australian spotted gum, yacal and other tropical hard woods are occasionally used in boat building, but their characteristics have little interest for the average motor boatman. On the west coast Douglass fir, Oregon pine and redwood are employed by the builders to some extent, but Eastern specifications are followed in many cases, the woods mentioned being used mostly for planking or finish in localities where they are easily obtainable.

ALLAN O. GOOLD.

Ventilating the Cruiser.

As we all know without circulation of air in a room or enclosed space the air becomes stagnant and as the cabin and adjoining parts are low the chance for circulation of air is small especially around the ice box; in the bilge, under the flooring and in the forecastle and in the stern. From these places the foul and stagnate air comes, and lodges in the cabin.

To overcome such a difficulty, place a hole in the deck not less than 6 inches in diameter, a larger size if possible will do better, as far forward as possible and there place a metal ventilator, and face it forward, having it made so as to be turned around to face the wind when the boat is not running.

When an excessive amount of air is required a cloth wind sail may be used; this will give a very large amount of air, as the area facing the wind is large. This requires some rigging to support the top and wings. For large cruisers this is used as it is a cheap and good means of driving air down, and as it can be taken down or put up without much trouble. It is never in the way when not in use as it can be rolled up and packed away.

The ventilators after passing down through the deck should extend down through the floor of the forecastle, if any, and as there will be an open space between the under side of the floor beams and the top of the ribs throughout the boat's length, this will allow the air to pass through and along the entire length of the boat to the counter or stern and then out through a hole about 8 inches in diameter, placed in the after deck, having a checkered metal plate and arranged so as to be closed during a storm or running in a heavy sea. It would be a good idea to place a small ventilator with the lower end to extend about 4 inches or 6 inches below deck, this will suck out the foul air which lodges in the cabin.

All lockers and closets should have the doors made in the form of a frame and covered with wire gauze or slats having openings between them; this will prevent foul air and dampness from lodgng inside.

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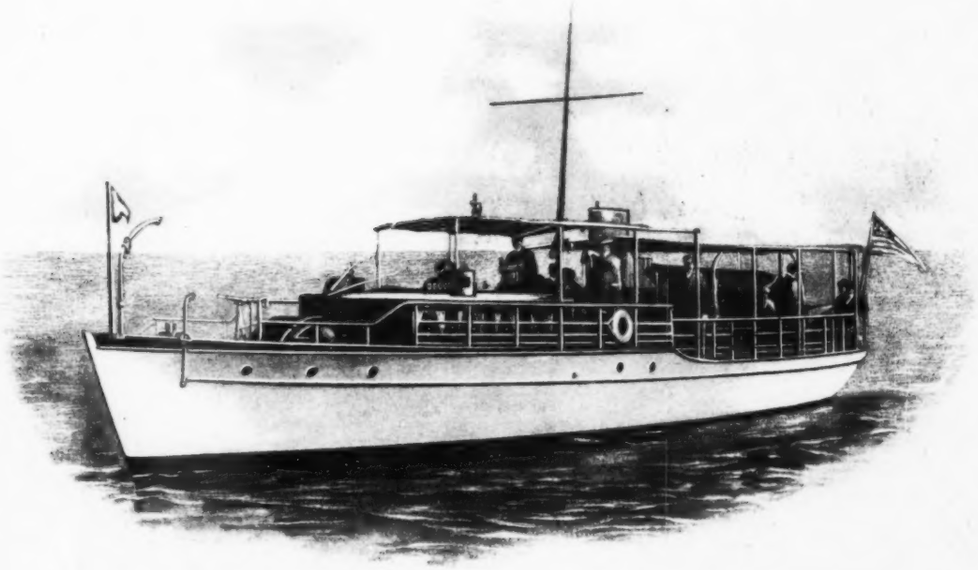

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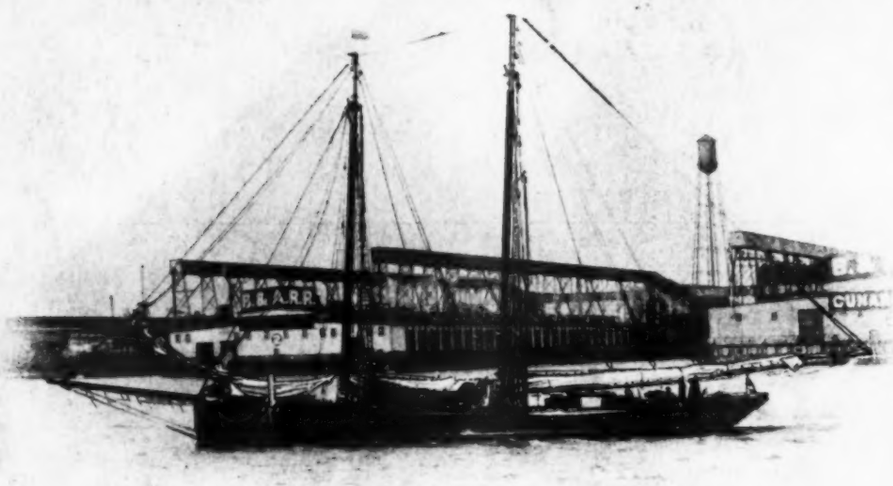

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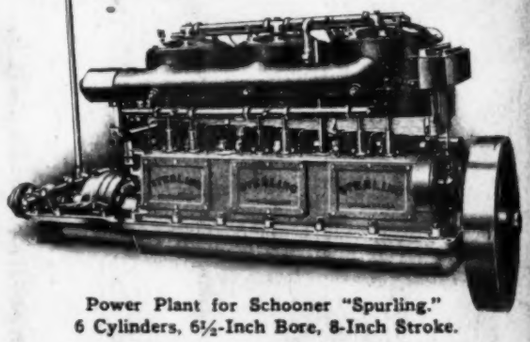

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